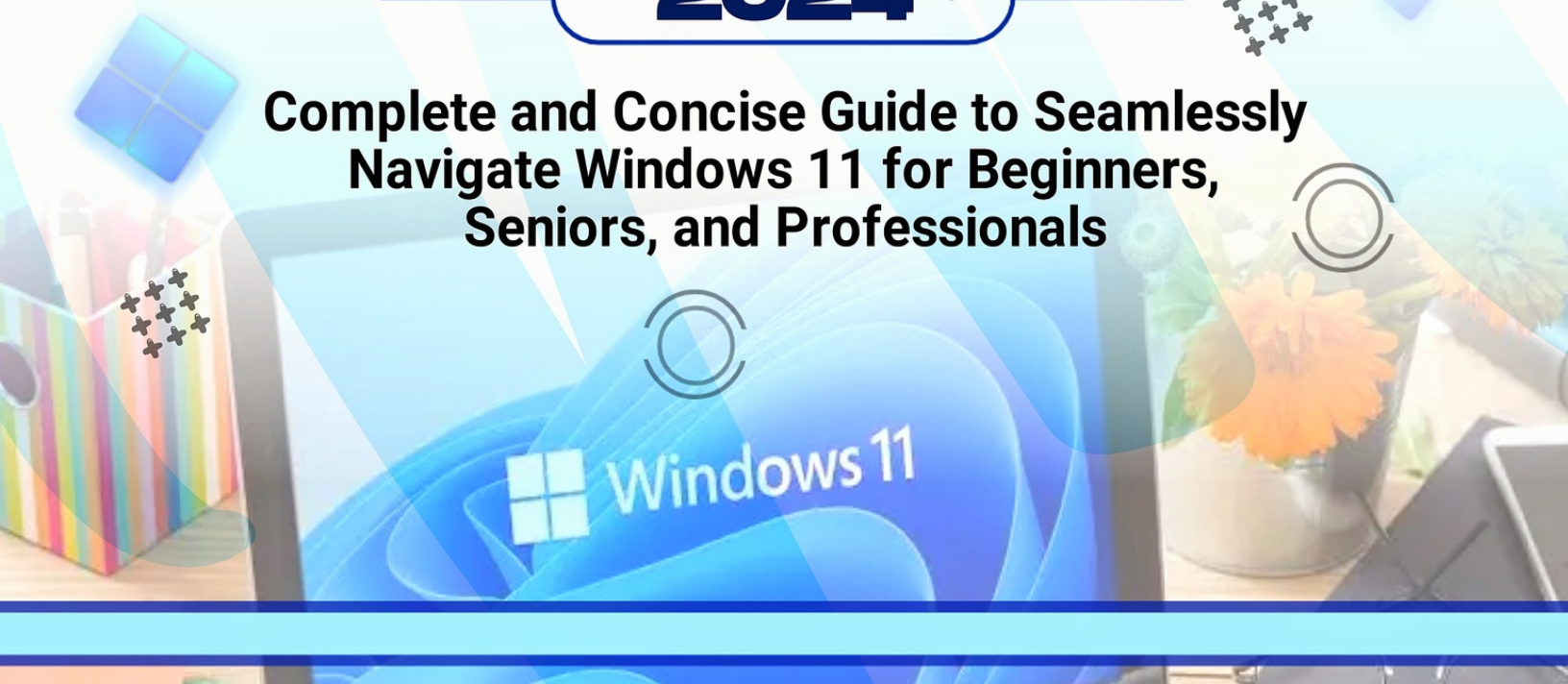
# WINDOWS 11 BIBLE

2024

**Complete and Concise Guide to Seamlessly Navigate Windows 11 for Beginners, Seniors, and Professionals**



# Windows 11 Bible

## Complete and Concise Guide to Seamlessly Navigate Windows 11, for Beginners, Seniors and Professionals

Robinson Cortez

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# OVERVIEW OF THIS BOOK

Windows 11 guide has been designed to be of immense help to anyone with a device that runs Windows 11. This guide has been

carefully written to ensure that users find it very easy to navigate through the latest upgrade designed by Microsoft. It has also been uniquely tailored to meet the needs of older people who are still quite tech-savvy and would love to make use of Windows 11. In this section, you will be introduced to some of the various chapters as well as nuggets that this book contains;

# Chapter 1: Introduction

This is the first chapter of this book. It brings to you the basic things you ought to know about Microsoft and Windows from its inception to the latest development. In this chapter, you will also learn about the various new interfaces that are embedded in Windows 11. Lastly, you will also learn about the various system requirements your system needs to have before you will be able to make use of Windows 11. This segment is also quite useful for those with PCs still running Windows 10 and who would love to upgrade their system to the new Windows 11.

# Chapter 2: Getting Started

In this chapter, you will be introduced to basic things about the new Windows 11. You will get to learn about the start menu, the taskbar, and the various icons that appear on the start page of Windows 11.

# Chapter 3: Navigating Windows 11

In this chapter, you will learn the basics of File Explorer, and how to make use of Windows search to swiftly get to where you would like to go or locate any application or setting you would like to make use of. You will also learn how to use the virtual desktop and task view.

# Chapter 4: Personalization and Accessibility

Most people are only satisfied with their computer after they have personalized it. Personalization helps an individual feel more like they are in total control of their device. In this chapter, you will learn about how to get your desktop background customized, utilizing themes and accent colors to your advantage, and you will also learn about the various accessibility features that older people can make use of. If you are quite old or have an elderly person you would like to get a Windows 11 gadget, this chapter is of extreme importance to you.

# Chapter 5: Working with Apps and Programs

Of what use is your computer if there are no applications on it? Applications are the main things people use in completing their tasks. In this section, you will learn how to install and uninstall applications, download applications from and make use of the Microsoft Store, and multitask with the use of Snap layouts.

# Chapter 6: File Management

Organizing one's document is key to ensuring that you have all of your files well arranged in a particular place on your computer. In this chapter, you will learn how to organize files and folders, and make use of the various features that are embedded in File Explorer and you will also learn how to get the best from your external device and storage through effective management.

# Chapter 7: Internet and Browsing

We are in a world where almost everything is happening online. What is the use of your device if you cannot gain access to the internet? In this chapter, you will learn about making use of the internet which also includes the Microsoft Edge browser. You will learn how to navigate the web in a safe manner, and you will also learn how to manage bookmarks and tabs.

# Chapter 8: Communication and Collaboration

There is always a need for effective communication and collaboration especially when it has to do with the work environment. In this chapter, you will learn how to configure Email and calendar and make use of Microsoft Teams for video calls. You will also learn how to share and collaborate on various documents to ensure that you get the best of everything you have to get done, especially with your colleagues.

# Chapter 9: Security and Privacy

Bad boys are all around and most especially online hence the need to ensure that your device is well protected at all times. In this chapter, you will learn about Windows Defender and Antivirus, privacy settings, and permissions, and you will also learn about two-factor authentication which is a very good method to ensure you are well protected.

# Chapter 10: Troubleshooting and Maintenance

Any personal thing you own ought to be well taken care of and if at any time it happens to malfunction; such problems should be sorted immediately. This also applies to your device. In this chapter, you will learn about system updates and Windows updates, you will learn about troubleshooting issues that may arise while you are using your system, and you will also learn how to create system restore points.

# Chapter 11: Advanced Customization

Would you like to customize your device even more? Then this chapter is absolutely for you! In this chapter, you will learn how to customize the taskbar and start menu, make use of group policies and power user settings(which can help get the best use of your system), registry tweaks and you will also learn how to make use of Windows Subsystem for Linux (WSL) Configuration.

# Chapter 12: Media and Entertainment

You do not need to wait till Friday night before you get groovy! You can always enjoy the best of music and films right on your system and from just anywhere you choose. In this chapter, you will learn how to play music and videos, make use of photo apps, play entertaining games, and also make use of advanced graphics settings and optimization.

# Chapter 13: Senior Friendly Features

Due to the fact that this book is all-encompassing, this chapter was dedicated to the older generation. In this chapter, you will learn how to enlarge text and icons. This is because old people are often diagnosed with sight problems, as well as voice control and Cortana. All of these settings when learned will help the older ones make the best use of their devices.

# Chapter 14: Tips and Tricks

It's nice to have some tricks and tips you can make use of in making the most of your device. In this chapter, you will learn about the various keyboard shortcuts you can use in order to enhance your efficiency, you will learn about time-saving gestures on touchscreen devices and you will also learn about the various Windows 11 hidden gems.

# Chapter 15: Backup and Data Recovery

There are times when you may mistakenly delete some files or have a need to move your files from one place to another. In view of this, in this chapter, you will learn how to ensure your files are well backed up, make use of Windows Backup and restore, and you will also learn about creating recovery drives.

# Chapter 16: Networking and Connectivity

In this chapter, you will learn about how to connect to Wi-Fi networks, and configure VPNs for privacy, and you will also learn how to share files and printers.

# Chapter 7: Performance Optimization

When you have used your device for quite some time, there might be a need for you to optimize its performance a little. In this chapter, you will learn how to speed up Startup and Shutdown, manage background applications, and monitor system resources and you will also learn about overclocking and hardware tuning.

# Chapter 18: Advanced Troubleshooting

In this chapter, you will learn about making use of the Windows Performance analyzer, you will learn about making use of command prompt and PowerShell tricks, and you will also learn about diagnosing hardware and driver issues.

# Chapter 19: Developing on Windows 11

Microsoft openly disclosed that Windows 11 was designed with developers in mind. This chapter hence has been dedicated to anyone who is a developer. In this chapter, you will learn about installing development tools, writing and debugging code, and also learn about Windows App development.

# Chapter 20: Virtualization and Hyper-V

In this chapter, you will learn about configuring virtual machines, and also making use of Hyper-V for testing and development.

# Chapter 21: Advanced Networking and Security

In this chapter, you will learn about firewall configuration and rules, network policies, and group security and you will also learn about encryption and secure boot.

# Chapter 22: Cloud Integration and One Drive

The loss of documents is an occurrence no one really wants to deal with. It can be very frustrating to lose a document especially when it is one that is very important.  In this chapter, you will learn how to ensure you never suffer from file loss with the use of OneDrive. You will also learn how to collaborate with people on a document, especially those from your workplace. This can help ensure that work tasks are completed in due time.

# Chapter 23: Windows Subsystem for Linux

In this chapter, you will learn about advanced WSL configuration tips, running GUI applications in WSL, and how you can integrate WSL with development workflows.

# Chapter 24: Windows 11 Deployment and Management

In this chapter, you will learn about enterprise deployment strategies, Windows autopilot, and modern deployment, how to manage Windows 11 using Intune, and you will also learn about group policy updates and its best practices.

# Chapter 25: Data Protection and Bitlocker

Data is a big deal in today's world and everyone would like to learn how to ensure that their data is not leaked. In this chapter, you will learn about the use of BitLocker for drive encryption, and the use of BitLocker to go for removable storage, and you will also learn how to use advanced BitLocker configuration and recovery.

# Chapter 26: PowerShell Scripting and Automation

In this chapter, you will learn about PowerShell, how to write PowerShell scripts for automation, and how to manage Windows 11 with the use of PowerShell.

# Chapter 27: Advanced Security and Windows Hello

The need for security and more security can never be overemphasized in our world today. In this chapter, you will learn about Windows Hello biometric authentication, FIDO2 security keys and authentication and you will learn about Windows Hello for Business too.

# Chapter 28: Performance Monitoring and Analysis

Get to know how your PC is fairing; this is very important for you because you are able to detect first-hand issues anytime they arise. In this chapter, you will learn about the resources monitor and task manager advanced features. You will also learn to make use of the Windows performance monitor.

# Chapter 29: Gaming and Graphics Optimization

This is a chapter that will be of great interest to game lovers. In this chapter, you will learn about DirectX12 ultimate features, Nvidia DLSS, and AMD fidelity FX super-resolution, and you will also learn about advanced graphics settings for gamers. If you love to play games t and would also like to get the best from your PC in order to enjoy your games more you should study this chapter well.

# Chapter 30: Advanced Networking and Remote Desktop

In this chapter, you will learn how to configure network policies, and make use of remote desktop protocol security, and you will also learn about remote desktop services and virtual desktop infrastructure.

# Chapter 31: Windows 11 for IoT and Embedded Systems

The Internet of Things is going viral nowadays. Almost everyone wants to have things automated. Speak in your house and the light comes on, make use of amazing devices in the world of medicine and agriculture. In this chapter, you will learn how to develop an application for IoT, and you will also learn how to deploy Windows 11 on embedded devices.

# Chapter 32: Windows 11 for Accessibility

Seniors might not be able to operate their devices just as well as the younger folks would. In this chapter, you will learn how to better access Windows 11 through the use of its assistive technologies and features. You will learn about some third-party software that you can make use of and how best to test your accessibility features before deploying them.

# Chapter 33: Edge Computing and Windows Containers

In this chapter, you will learn about Windows Containers, and how to deploy Microservices with the use of Containers and you will also learn about Kubernetes and Container Orchestration.

# Chapter 34: Advanced Disk Management

In this chapter, you will learn about how to get your disk properly managed. You will learn about dynamic disks and raid configuration, disk cleanup, and optimization; this is quite important to ensure that you have just the important things on your disk and also have enough space on your disk for something very important you would like to save.  Lastly in this chapter, you will also learn about how to resize and manage your disk partitioning.

# Chapter 35: Data Recovery and Forensics

In this chapter, you will learn about Windows File History and previous versions, making use of data recovery software, and you will also learn about digital forensics basics on Windows 11.

# Chapter 36: Enhancing Productivity with PowerToys

In this chapter, you will learn about PowerToys Utilities, and how to get your keyboard shortcuts customized, you will also learn how to boost efficiency with fancy zones and run launchers.

# Chapter 37: Managing User Accounts and Family Safety

The Internet is a free world with so much content flying all around. There is a need to protect our young ones from content that is not for their age. In this chapter, you will learn about user account control customization, family safety features, and parental controls, and you will also learn how to set up a child account.

# Chapter 38: Advanced File Sharing and Permissions

In this chapter, you will learn about sharing files and permissions. You will also learn how to manage NTFS permissions and you will learn about access control lists.

# Chapter 39: Windows Update Strategies and WSUS

In this chapter, you will learn about Windows updates for business, and Windows server update service and you will also learn about deferring updates and quality vs. against feature updates.

# Chapter 40: Windows 11 for 2-in-1 Devices

In this chapter, you will learn about optimizing touch and pen input, tablet mode, and continuum, and you will also learn about gesture controls and hybrid usage.

# Chapter 41: Customizing System Sounds and Notifications

In this chapter, you will learn about effectively managing system sounds, customizing notification settings, and syncing notifications across various devices.

# Chapter 42: PowerShell Desired State Configuration (DSC)

In this chapter, you will learn about DSC, how to write DSC configuration scripts, and how to apply and manage DSC configuration.

# Chapter 43: Windows 11 Security beyond Basics

In this chapter, you will learn about application control policies, credential guard and device guard, exploit protection, and Windows Defender ATP.

# Chapter 44: Windows 11 for Content Creators

This is a chapter also for content creators. In this chapter, you will learn about the use of Windows Ink Workspace for creative work, you will also learn about advanced photo and video editing tools and you will also learn how to get your displays calibrated.

# Chapter 45: Windows 11 and Internet of Things (IoT)

In this chapter, you will learn about integrating Windows 11 with IoT devices, you will also learn about IoT Core and Windows IoT Enterprise. Lastly for the chapter, you will learn about prototyping IoT solutions with Windows 11.

# Chapter 46: Automating Tasks with Task Scheduler

In this chapter, you will learn about the use of the task scheduler and also how to create advanced scheduled tasks. You will also learn to make use of triggers and actions in an effective manner.

# Chapter 47: Extending Windows 11 with Extensions

In this chapter, you will learn about Microsoft Edge extensions, various third-party extensions, and how to develop extensions for Windows 11.

# Chapter 48: Enhancing Battery Life and Power Management

In this chapter, you will learn how to make use of the advanced power options, battery saver mode, and power plans, and you will also learn about managing background processes so as to control battery drain.

# CHAPTER 1
# INTRODUCTION TO WINDOWS 11

Windows is an operating system that Microsoft developed. The operating system is what enables you to make use of the computer. Windows is already loaded on almost all personal computers widely called PCs which also enables it to become the most popular system in the world. With the use of Windows, you are able to complete all of your tasks on the computer on a daily basis. For instance, you can make use of Windows to surf the internet, check through your emails, modify pictures, listen to any music of your choice, play games, and a host of others. In various offices around the world, Windows is also used because it offers you access to various productivity tools like calendars, word processors, and spreadsheets.

**Below is an overview of just how Windows commenced its operation;**

- **MS-DOS and Early Days**: In the very late 1970s and the earlier part of the 1980s, the very first success achieved by Microsoft was the Microsoft Disk Operating System with the acronym MS-DOS for the first personal computer of IBM which was released by the IBM PC in the year 1981. MS-DOS offered a command-line interface for various users in order to have a perfect and seamless interaction with the computer. Nevertheless, this user interface didn't have a graphical user interface (GUI) and lacked multitasking capabilities.
- **Graphical User Interfaces**: The popularity of the use of Graphical User Interfaces commenced in the early 1980s with systems such as the Apple Macintosh which made use of icons and mice for seamless interaction. Microsoft could recognize the potential GUIs and commenced work on its own graphical operating environment.
- **Windows 1.0**: In the year 1985, Microsoft launched Windows 1.0 which offered a graphical interface that could run on top of MS-DOS. Windows 1.0 enabled various users to launch

various applications and programs at the same time and also launched what is now referred to as multitasking. Nevertheless, it was not regarded as a full operating system but it was known more as an extension of the MS-DOS.

- **Windows 2.0 and 3.0**: Windows 2.0 was launched in the year 1987; it included major improvements in graphics and performance. It was then immediately followed by Windows 3.0 in the year 1990 which also represented a very significant step forward with much-improved graphics, and multitasking and also offered more support for more applications and programs. Windows 3.0 became a widely used platform for users of personal computers and also helped with the establishment of the graphical user interface as a model.
- **Windows 95**: With 1995 came the release of Microsoft 95 (the 95 must have been coined from the year of launch) Microsoft achieved a major milestone in the evolution of Windows. It brought about the use of the Start menu, taskbar, and much more improved and advanced graphics. Windows 95 was a very important upgrade from the previous Windows as it came with a much more user-friendly and well-integrated experience.
- **Subsequent Versions**: Microsoft continued to evolve and went on to release more Windows such as Windows 98, Windows 2000, Windows ME (Millennium Edition), and Windows XP. Each of the listed versions brought about various degrees of improvements in performance, stability, and features.
- **NT-based Windows**: With the release of the Windows NT, there was an introduction of a more robust and stable architecture that was aimed at various businesses and enterprise users. Windows NT went on to evolve into other Windows like Windows XP, Windows Vista, Windows 7, Windows 8, Windows 8.1, Windows 10, and the latest Windows 11.

The next significant version of the Windows operating system, Windows 11, will replace Windows 10. On June 24, 2021, Microsoft made the announcement in a virtual event. In comparison to

Windows 10, Windows 11 adds a number of new features, upgrades to the user interface, and expanded capabilities. The Start Menu and Taskbar are centered in Windows 11, giving the interface a neater and more contemporary appearance. The Start Menu now has system tray improvements, Live Tiles, and app icons that are centered and aligned. Windows 11 adds new snap layouts and snap groups to improve the window management experience. The management of open windows by users is simple, which makes multitasking more natural. Windows 11 adds new snap layouts and snap groups to improve the window management experience. The management of open windows by users is simple, which makes multitasking more natural. In Windows 11, widgets are made available once again, providing rapid access to customized news, weather, calendars, and other information at a glance. With an emphasis on better app discovery, enhanced speed, and a greater variety of program types, including both conventional Win32 apps and cutting-edge Universal Windows Platform (UWP) apps, the Microsoft Store has been revamped for Windows 11. New system requirements for Windows 11 include support for contemporary 64-bit CPUs, UEFI firmware with Secure Boot, and TPM 2.0 (Trusted Platform Module) for increased security. By now I am sure you must be wondering if Windows is the only operating system that can be used with computers. The answer to that is NO. It all depends on the kind of computer you are using. There are other operating systems that can be used but they are pertinent to certain types of computers.

**These operating systems (OS) include;**

- Chrome OS is used basically for Chrome books. This type of computer was created by Google and it is quite affordable. It can be used for just basic computing functions such as surfing the net, working on your email, and composing very simple documents. Note however that Chromebooks cannot execute Windows programs like Office or Photoshop although they are able to execute the online version of these programs.
- One other amazing operating system is the macOS which is basically confined to Apple and is used basically for Mac computers.

- There is also Linux which is another amazing operating system. It is similar to the Chrome OS in that it can only handle very light operations such as surfing the internet, working on simple documents, and checking and replying to your emails.

## Overview of the New Interface

A revamped Start menu that resembles an app launcher, more rounded corners, snap controls that enable you to pin windows to specific locations on your screen (and snap groups), a new Widgets area and icon in the taskbar, and a new Windows setup experienced are just a few of the interface changes in Windows 11.

- **Snap groups and Snap layouts**: These are lovely features that allow you to have more flexibility and choice over just how you configure your display with various windows. Windows can now be organized in various ways, while Windows will remember your layouts so that they can be gotten with ease much later. Windows 11 will also remember just how you laid out your windows on an external display and offer you access to that same layout whenever you re-dock.

In comparison to Windows 10, several icons have also been refreshed, giving everything a new vibe. It is more of iteration than a

significant departure from Windows 10 in terms of functionality. The redesigned Start menu, which is visible above, is the main design modification. The taskbar icons have been moved to the center; if desired, they can be moved back. You may view your most recently touched files in the Start menu as well. The Widgets bar, which you may resize, essentially replaces the Start menu live tiles in Windows 10 and allows for the delivery of personalized information such as pertinent news articles.

On tablets, snapped Windows alter orientation if you have a need to change to portrait landscape. Touch targets have also been made larger hence it's quite easier to use for touch. Android apps will also now be able to be installed on Windows 11 through the Microsoft Store and Microsoft Teams is baked into the operating system, seemingly now being preferred to the officially long-forgotten Skype. More than ever, Microsoft wants to present Windows as a platform for other products. Microsoft claims that regardless of the developers' methods for collecting payments from customers, it will let any kind of app — not only "native" store apps — into the store. It's interesting to note that Windows 11 lacks a number of features, which we've listed in a separate article. These features include Live Tiles, which have been replaced by the Widgets sidebar, Tablet Mode, Timeline, and Cortana's prominent placement. There are also many additional apps that are no longer available, like the previous version of Internet Explorer.

## System Requirements and Compatibility

Windows 11 is designed to get you closer to what you love and is released at a time when the PC is playing an even more central role in the way people would like to connect, create, and play. When the decision was made on where to configure the minimum system requirements for Window 11, Microsoft focused on three basic principles which was reliability, security, and compatibility.

**Below are the minimum system requirements your PC ought to meet so you can have a wonderful computing experience;**

- **Processors/CPUs (Central Processing Units)**: 1 GHz or faster with about 2 or more cores and also showing on the list of approved CPUs (you might want to check Microsoft website for this). The processor in your PC will be a very important determining factor for running Windows 11. The clock speed (the 1 GHz or faster requirement) and the number of cores (2 or more) are quite inherent to the processor design as it was manufactured and are not considered upgradable components.
- **RAM**: 4GB. If your PC happens to have less than 4GB of memory, there are times when there are options for you to upgrade in order to get more RAM. There might be a need for you to consult the manufacturing website of your PC or with a retailer in order to see if there are easy and affordable options to meet the minimum requirements for Windows 11.
- **Storage**: 64GB or larger storage device. If your PC doesn't have a large enough storage drive, there are time options for upgrading the drive. You may need to consult your PC manufacturer's website or with a retailer to see if there are easy and affordable options to meet the minimum requirements for Windows 11.
- **System Firmware**: UEFI (for unified Extensible Firmware, Interface, a modern version of the PC BIOS) and Secure Boot capable. If your device does not meet the minimum requirements due to the fact that it is not Secure Boot capable, there might be a need for you to see if there are steps you can take in order to enable this. Secure Boot can simply be enabled with UEFI and you can then be patient enough to study it so you can have a perfect understanding of the potential options available to alter settings to make this possible.
- **Graphics Card**: This should be compatible with DirectX 12 or later with WDDM 2.0driver.
- **Display**: High definition (720p) display that is much greater than 9” diagonally, 8 bits per color channel. If the size of your screen is less than 9”, the intended user interface of Windows may not be totally visible.

# Activity

1. Give a brief introduction to Windows 11.
2. Highlight the notable features that have been included in the interface of Windows 11.
3. Mention the various system requirements needed for your system to be able to run on Windows 11.

# CHAPTER 2
# GETTING STARTED

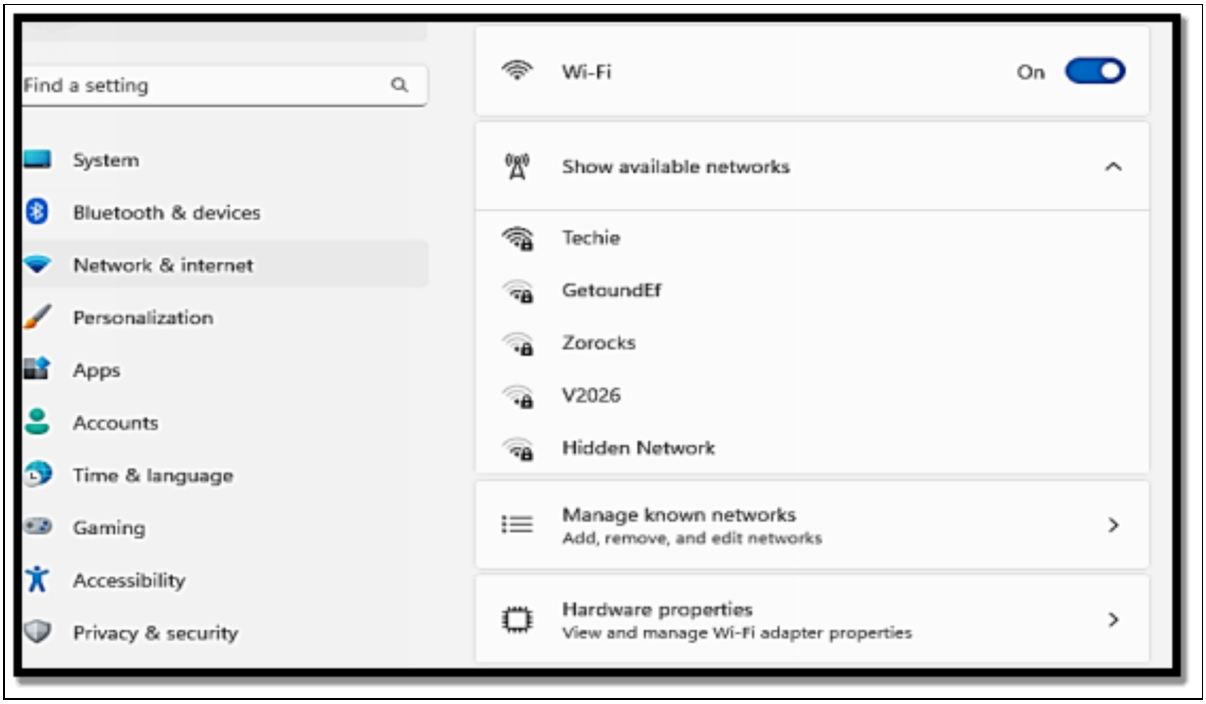
In this chapter, you will learn all you need to know about setting up and initializing your computer for your use. It has to do with lots of steps to ensure your computer is ready for your daily tasks like surfing the internet, customizing settings, working on documents with the use of installed software, and so on.

## Setting Up Your Computer

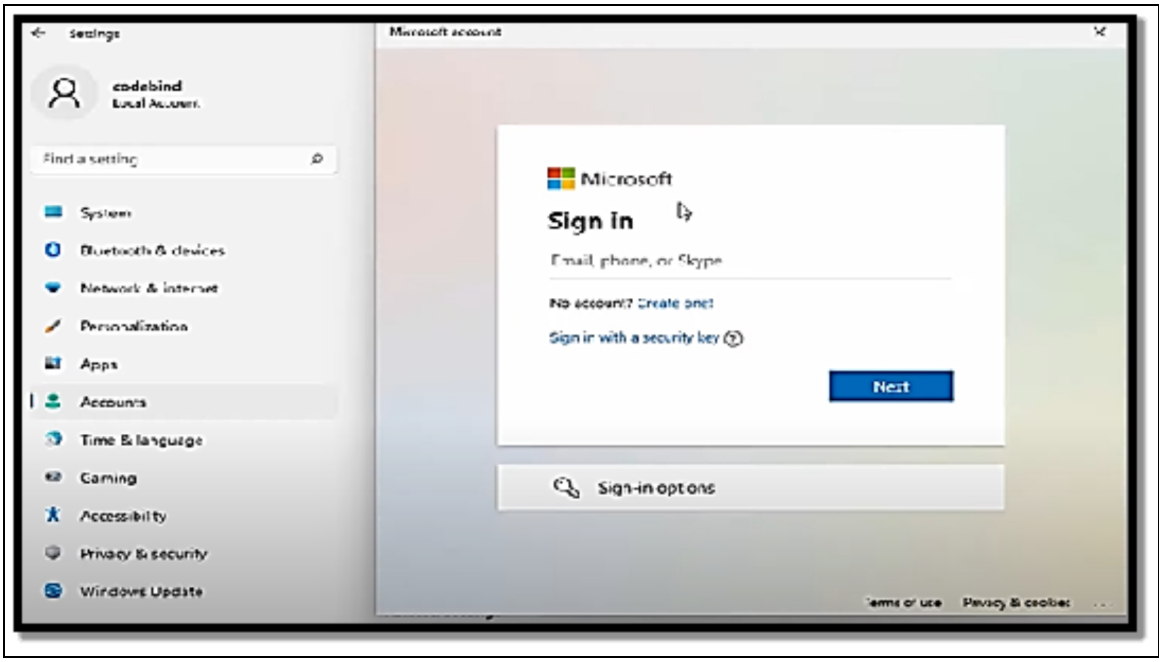
To guarantee that a computer is ready for usage, numerous actions must be taken during setup. The general procedures for setting up a new computer are listed below. Remember that depending on the kind of computer (desktop or laptop) and operating system you're using, particular instructions can change.

- **Unboxing and inspection**: Carefully unpack your computer, accessories, and peripherals. Inspect all and check for any form of damage that might have happened in the course of shipping. If you locate any form of damage, reach out to those you purchased from and swiftly ask for a refund.
- **Connecting Hardware**: Based on your type of computer, follow the steps below;
  - **Desktop Computer**
    - Position **the computer tower** in a location that is quite suitable with sufficient ventilation.
    - Connect **the monitor** to the computer with the use of the appropriate cable (HDMI, DisplayPort, VGA, etc.)
    - Plug **in the keyboard and mouse to the various USB ports available**.
    - Connect any other peripherals like speakers or printers.
  - **Laptop Computer**
    - Open **the laptop and power it on**.
    - Connect the charger to the laptop and an electrical outlet.

- **Powering On**: Touch the power button on the computer or laptop to bring it on. Follow any onscreen instructions that may show while the initial boot process is ongoing.
- **Operating System Setup**: If you have a brand new computer or you need to install the operating system yourself; follow the procedures below;
    - Follow the on-screen prompts to choose your preferred language, region, timezone, and keyboard layout.
    - Connect **to any available Wi-Fi network if applicable**.



- Sign up or sign in with your Microsoft account.




- Complete **the configuration process** which also may involve the configuration of privacy settings as well as preferences.

- **Software Installation**: Ensure you have all the necessary applications and software installed. This ought to include web browsers, office suites, media players, and any other specialized software you feel will be needed for your personal use.

- **Updates and Drivers**: Ensure that your operating system is up to date with the latest updates and patches. Furthermore, install any driver you feel will be needed for any of your hardware components like printers.
- **Data Transfer and Backup**: You might need to copy your files, papers, images, and other data to the new computer if you're moving data from an old computer. In order to safeguard your data in the event of hardware failure or other problems, think about setting up a backup solution.
- **Security Setup**: Make sure that your computer is well protected by configuring various security measures;
  - Install **a trustworthy antivirus and anti-malware software**.
  - Make use of a firewall for network protection.
  - Configure secure login methods like PIN, password, or the use of biometric authentication.

- **Data Organization**: Arrange your files and design folders to ensure data are well kept and well-structured too. Note also that ease of access is also a very important factor that must be considered.
- **Troubleshooting:** Ensure you check all hardware and software components to be sure they all are functioning properly. Be sure to deal thoroughly with any issue that may arise during this process.
- **Create Recovery Options**: Create a recovery system or a system restores point such that you are able to restore your

computer to a functional state in case problems arise much later in the future.

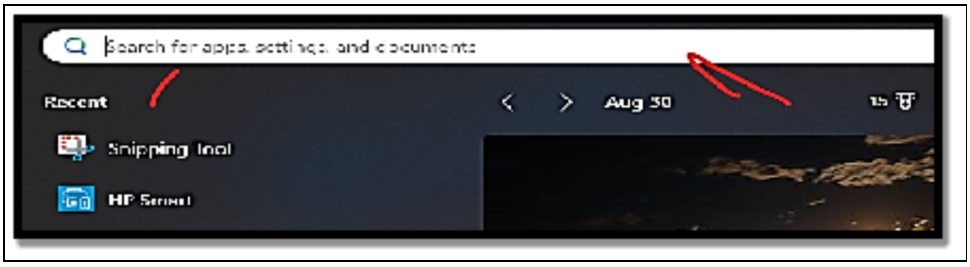
Keep in mind that these instructions are only a general reference; depending on the type of computer and operating system you are using; your setup procedure may vary. For comprehensive advice on configuring your specific computer model, always refer to the manufacturer's instructions and user manuals.

## Exploring the Start Menu

Windows 11 mimicked Apple's strategy on the Mac when it came to the desktop. As a result, the taskbar and Start menu are both in the middle, and the taskbar's icons operate similarly to Mac icons. I appreciate this new strategy, and I really like the redesigned Start menu, which has new categories and things and is organized differently than it was in Windows 10. Windows 10's tiles are gone, and Windows 7's traditional shortcuts are now available. The very first thing that will be made visible to you when you either click or touch the start icon is the Start menu. This is Microsoft’s first centered start menu in a Windows operating system since inception and as expected, it comes with a lot of difference than the start menu in Windows 10.

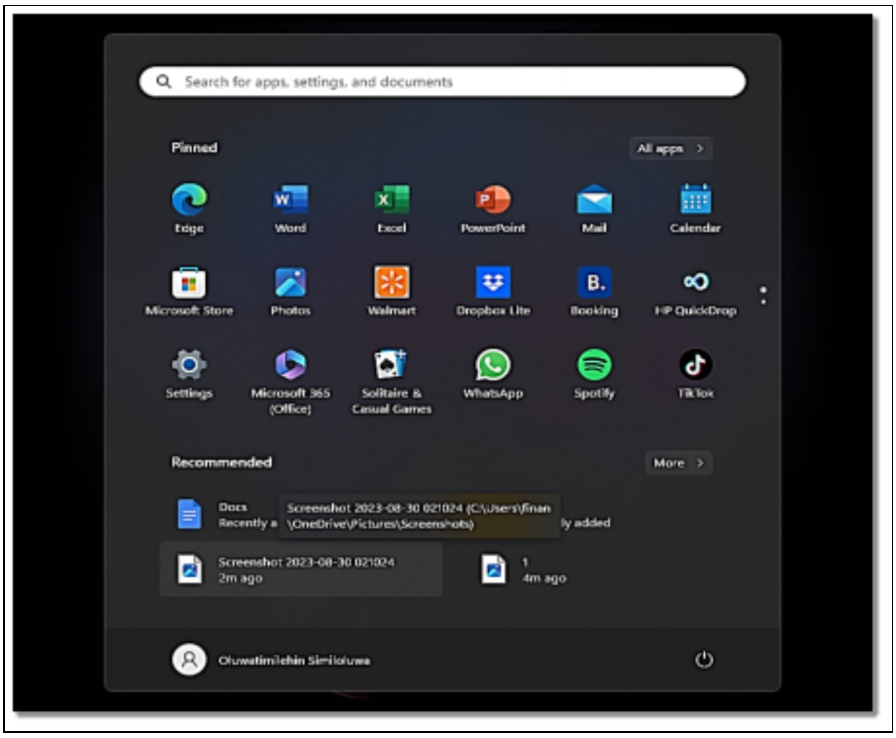
**Below is a preview of the organization of the start menu;**

- In the upper part of the Start menu is located **a search box** that can be used to locate anything from installed applications on your computer to configurations, files, or various websites on the internet. All you have to do is input whatever it is you would like to search for and then tap the enter button.



- Followed by this is **the Pinned section** which has about three rows of shortcuts to applications installed. These shortcuts are instantly configured by Windows 11 but then you can also choose to personalize the list. Although the default with Windows 11 is up to 18 shortcuts but then you can always alter this to either increase which is most often the case or you can also choose to remove some applications already in the list of the default section if you will not be making frequent use of the application. To move to the next screen of shortcuts, all you have to do is click or touch one of the **dots on the right side of the Pinned section**.

- At the top of the Pinned list to the right is the **All Apps button**. Tapping or selecting this button will lead to an opening of a list containing all of the various applications in Windows 11.
- Subsequent to the **top Pinned list** is the **recommended section** which has recently added applications, the applications you use the most, and also the items you happen to make use of the most. A More button on the right can be seen that simply contains more applications that you have been using recently.
- At the bottom of the **Start menu is your username** as well as your picture on the left and also on is your power icon.




Note however that unlike Windows 10, you are unable to modify the size of the Windows 11 Start menu. You are somewhat stuck with the default size and its various sections.

## Personalizing the Start menu

The Start menu of Windows 11 can be personalized to suit your taste. Below are some of the things that you can do to ensure you are freer with the use of the Start menu;

## Moving, removing, and Adding pinned apps

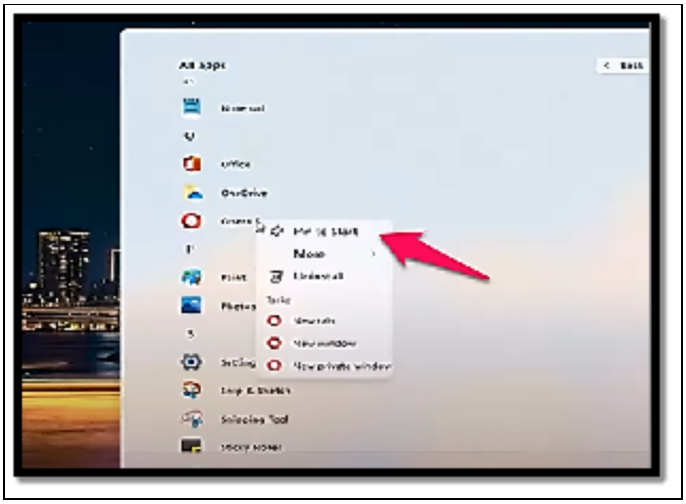
For a start, you might just want to jump at the Start menu and remove the pinned app shortcuts you don't want anymore, pin shortcuts to apps you feel you might use more often, and then alter the various positions of these shortcuts for ease of access.

**Follow the set of instructions below to get this done with ease;**

- Select or touch the **Start menu icon**.
- Right-click the **app shortcut** or press and hold down **the app to unpin the app**.

- Select or touch Unpin from Start.
- Click or touch the **All Apps button**.

- If you would like to pin an application, move down the list of applications and then right-click the app or you can also choose to press and **hold down the app**.
- Choose **Pin to Start**.

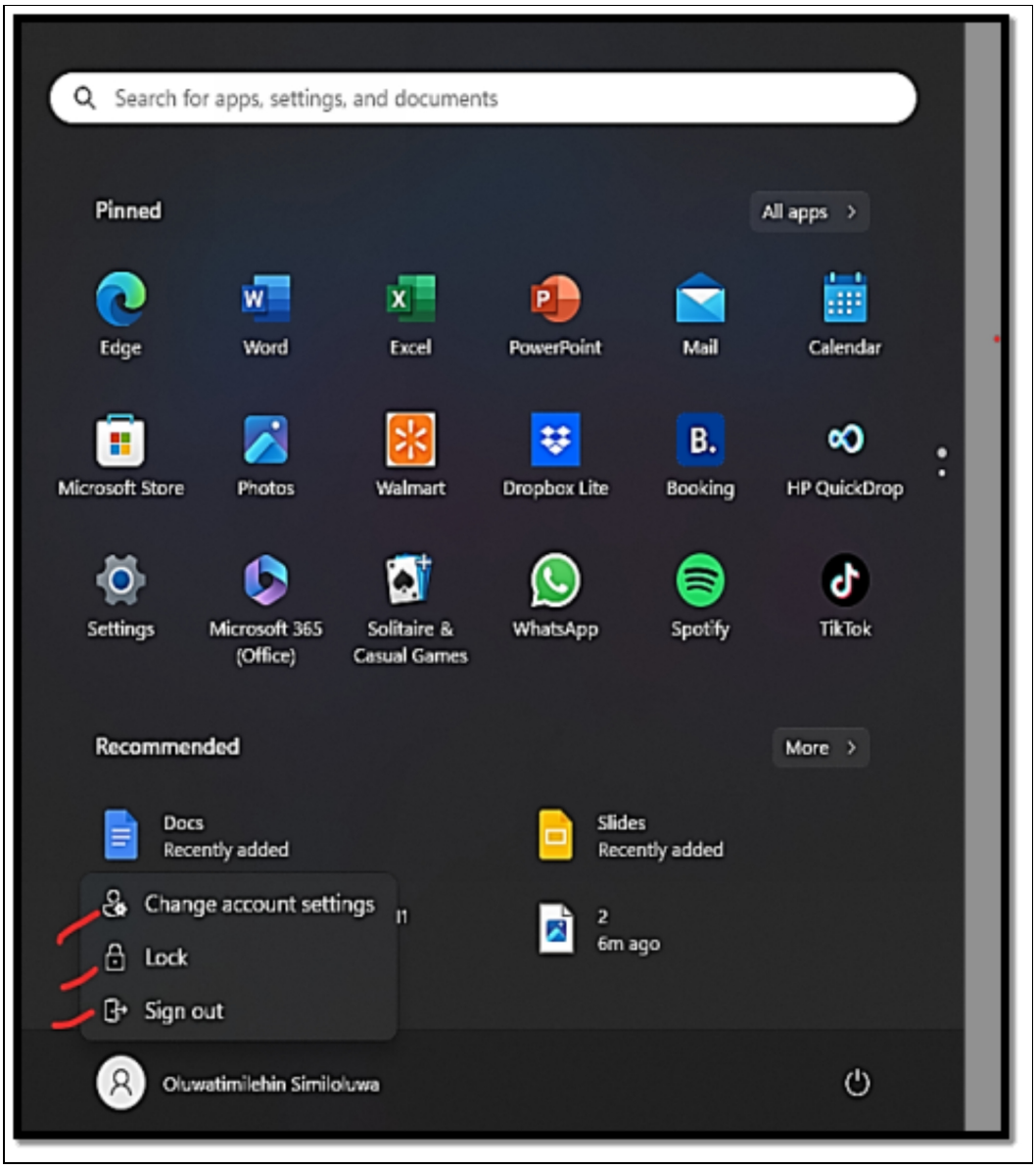



- Select or touch the **Back button** to see the app in the Pinned section.

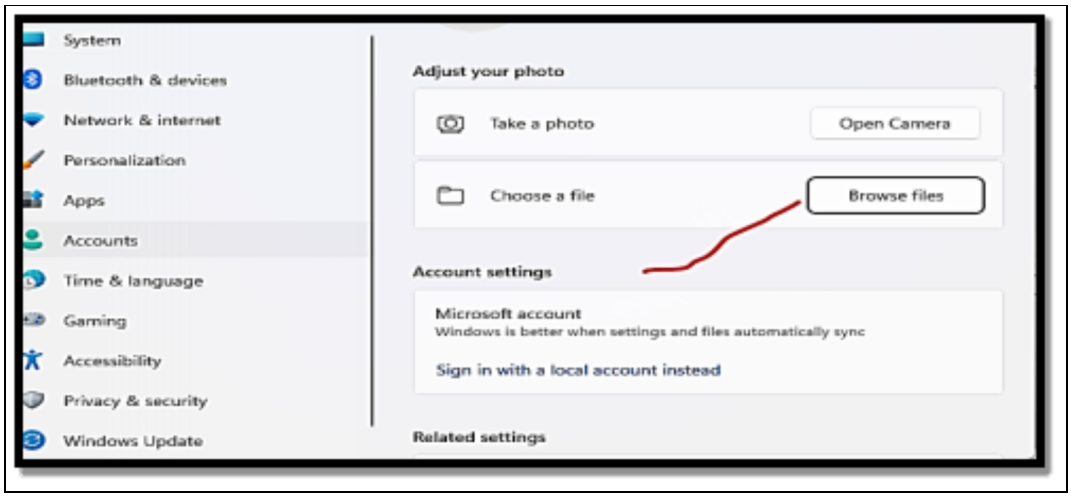
## Changing your picture

**One other modification that can be done to the Start menu is for you to change your picture that is located at the bottom left corner;**

- Open the **Start menu**, touch or choose **your picture**, and then choose **Change Account Settings**.

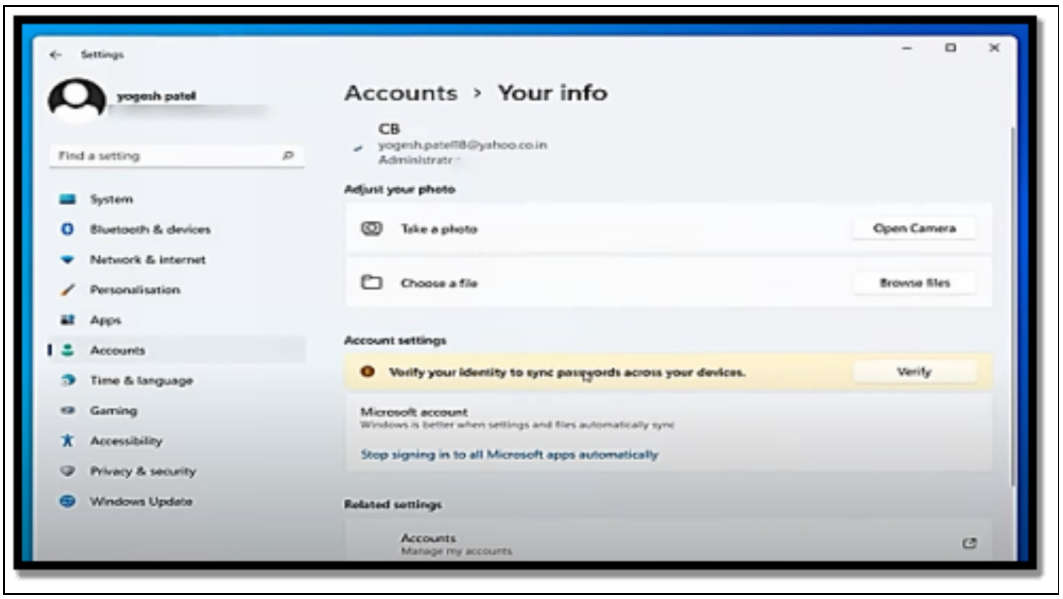



- **If you have a picture you would like to make use of already; take the steps below;**
    - Close to the **Choose a File option**, select or touch **Browse Files, and navigate to the picture.**




- Choose **the picture**, and touch or select the **Choose Picture.**

- If there is a need for you to make use of the webcam of your computer to have another picture in place, follow the steps below;
  - Ensure you are in order to take a good picture and then tap or select **Open camera.**
  - In the Camera app window, touch or select the **Take Photo button**




- And then check if you are cool with the picture by touching the **Done option**.

## Adding and removing Start menu folders

The only icon that appears by default in the bottom-right portion of the Windows 11 Start menu is the power icon. To act as quick shortcuts to locations you frequently visit, you can add a number of folders adjacent to it. The settings, File Explorer, Documents, Downloads, Music, Pictures, Videos, Network, and the Personal folder (the folder for your user account) are all places where you can add shortcuts.

**The steps to add and remove folders from the Start menu are as follows:**

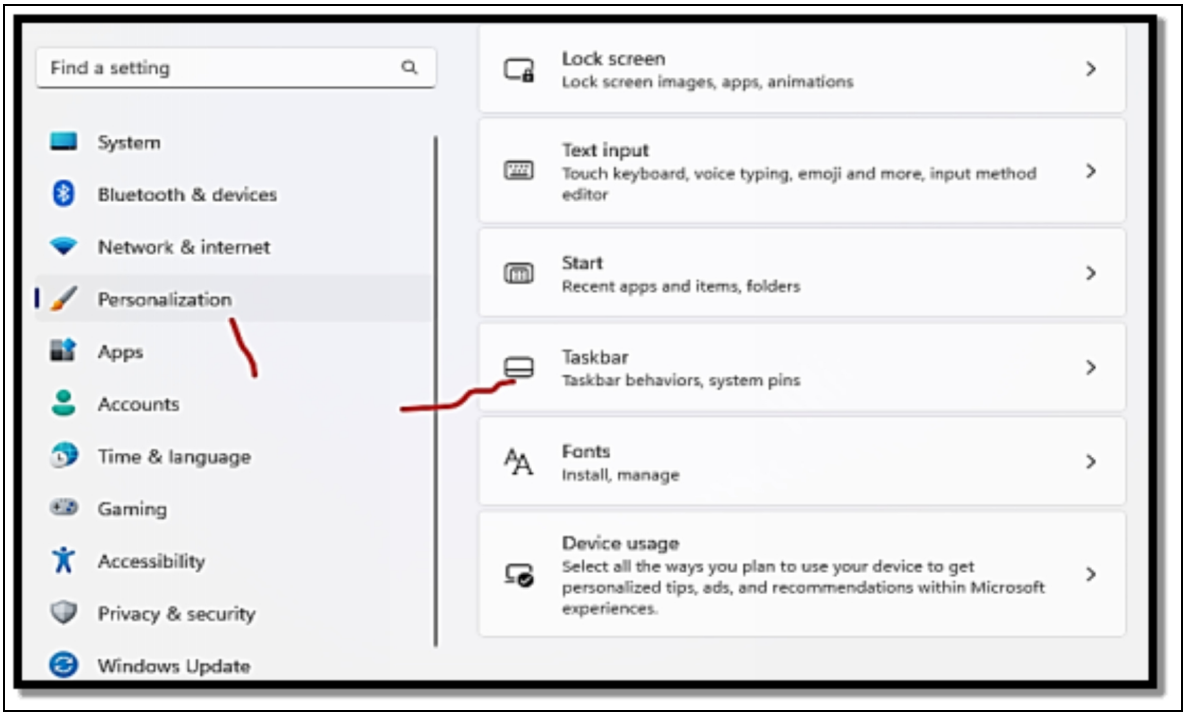
- Open the **Start menu** and choose or **touch Settings.**
- In the Settings app, choose or touch **Personalization, Start, and then Folders**.
- For each folder, you would like to have on your **Start menu, choose or touch the switch to bring it on.**
- For the folders you have no specific need on the Start menu, configure their switch to off.
- When you are done with all of these, close **Settings**.

## Moving the Start menu and taskbar to the left

The taskbar and Start menu are centered in Windows 11. You might prefer a more accustomed setup with everything aligned to the left side of the screen because this is different from Windows 10 and earlier versions of Windows.

**How to move the Start menu and taskbar are described here:**

- Open the **Start menu** and choose **Settings**.
- In the Settings app, choose or touch **Personalization and then Taskbar**.
- Navigate downwards to **Task Behaviors and choose it.**




- Select or touch **Taskbar Alignment** and click on Left.

## Using Taskbar and System Tray

The outdated Windows 7 taskbar was given the codename "Superbar" by Microsoft developers who were working on it. The Windows 11 taskbar is without a doubt an essential tool for all users, even though it is debatable how much of the Super in the taskbar is actually real. The Windows 11 taskbar is located at the bottom of the screen, with various icons in the middle. One major difference is that it is not aligned on the left anymore as it was in previous Windows like 10 and 7. This time, Microsoft has taken a cue from Apple's workbook, and both the Windows 11 taskbar and the Start menu are positioned at the center. Compared to Windows 10, the taskbar in Windows 11 is far less versatile. You can no longer alter its dimensions, for instance. No matter what, it's frozen at the bottom of the screen. You cannot add any toolbars because they are missing as well. I'm willing to wager that a lot of people won't like this very much, and I'm hoping that Microsoft will quickly reverse direction and bring back all the features we loved about the taskbar.

**There are about two different kinds of icons available on the taskbar;**

- **Pinned icons**: Windows 11 comes with about eight icons on the taskbar which are for Start, Search, Task View, Widgets, Chat, File Explorer, Microsoft Edge, and the Microsoft Store. Whenever a program is installed, you can tell whoever is installing the program to add an icon for the program on the taskbar. You can also choose to pin programs of your choice on the taskbar.
- **Icons associated with running apps and programs**: An icon for software appears on the taskbar each time it launches. Only one icon appears even if you run three separate instances of the program. The icon vanishes when the program ends.

Click or press a **program's icon** to launch it from the taskbar. Windows 11 adds an almost imperceptible line under the symbol for any running program, making it easy to identify which icons represent operating apps or programs. The line below a minimized running app's taskbar icon gets smaller. Two translucent squares surround the taskbar icon if there are many instances of the software running.

## Using jumps lists and other taskbar tricks

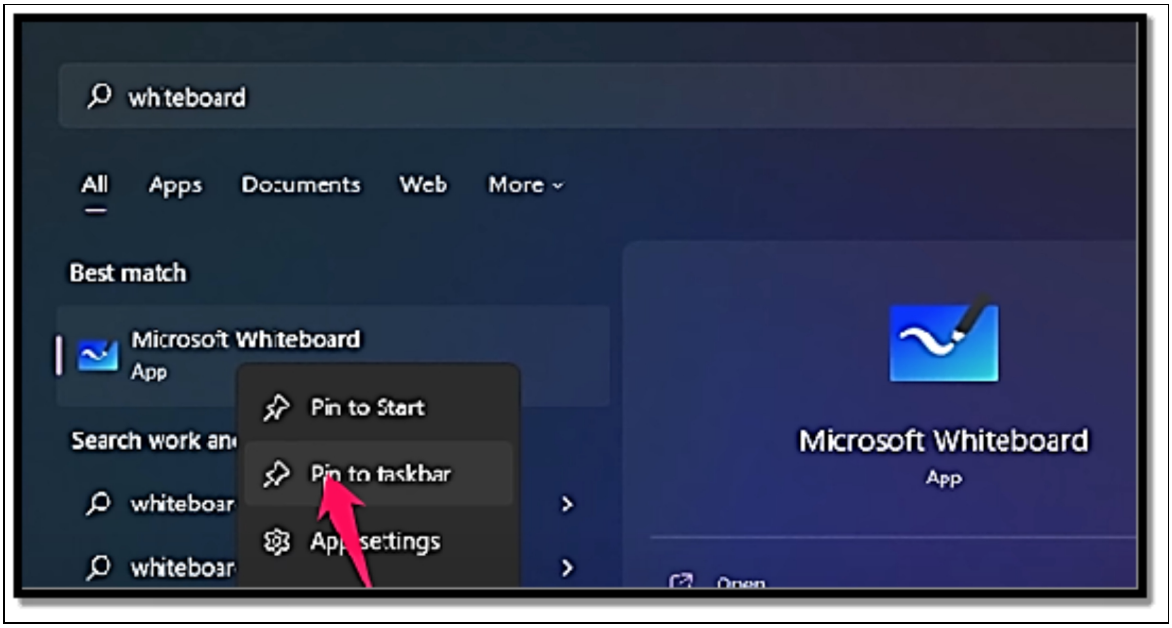
There are a bunch of links which usually is termed a jump list which is visible if you right-click an icon on the taskbar or tap and hold down on it if the icon is pinned or not. Depending on the program that is running, the jump list's contents change, but every jump list's bottom pane always includes the entry Unpin from Taskbar (or, if the program is running but not pinned, Pin to Taskbar). Jump lists were introduced in Windows 7, but they haven't gained much popularity. Jump list implementation varies greatly across non-Microsoft applications, from being overtly obsessional (as with Microsoft Edge) to careless.

**Below are the basics of the jump list;**

- It's quite easy to pin an item to the jump list. When you pin an item, it gets stuck to the jump list of a program. It doesn't matter if the item is opened or not. To have an item pinned, move your mouse cursor to the right side of the item you would like to pin and choose or tap the pushpin that shows. The item will then be positioned in a different Pinned pane at the top of the jump list.
- The jump list may also display your frequent folders or files of the file history of files you opened recently.
- The jump list has one not-so-obvious use. This is the fact that it enables you to open a second copy of the same application. Let's say you wish to transfer a few files from the Documents folder to a USB memory stick using the D: disk. File Explorer should be the first thing you select by clicking or touching the taskbar, followed by Documents on the left. You can choose your documents, copy them using the keyboard shortcut Ctrl+C, browse to D: using the list on File Explorer's left, and then paste them with Ctrl+V. However, it is quicker and simpler to create a second window of File Explorer and navigate to D: in that window, if you need to copy numerous documents. Then, you may choose and drag your files to the D: drive from the Documents folder.

## Pinning apps to the taskbar

- **Pin a program on the taskbar:** Right-click or touch and hold down on the program and select **Pin to Taskbar.**




- You can right-click **the icon** of a running program on the taskbar or its shortcut on the **Start menu, the desktop, and some other places**.

- **Move a pinned icon**: Choose or touch and **move the icon**. You can also choose to move an icon that has not been pinned into the middle of the pinned icons. When the program in sync with the icon stops, the icon will also disappear and all of the pinned icons will also move back into their position.
- **Unpin a pinned program**: Right-click or touch and hold down **on the icon and select Unpin from the Taskbar.**

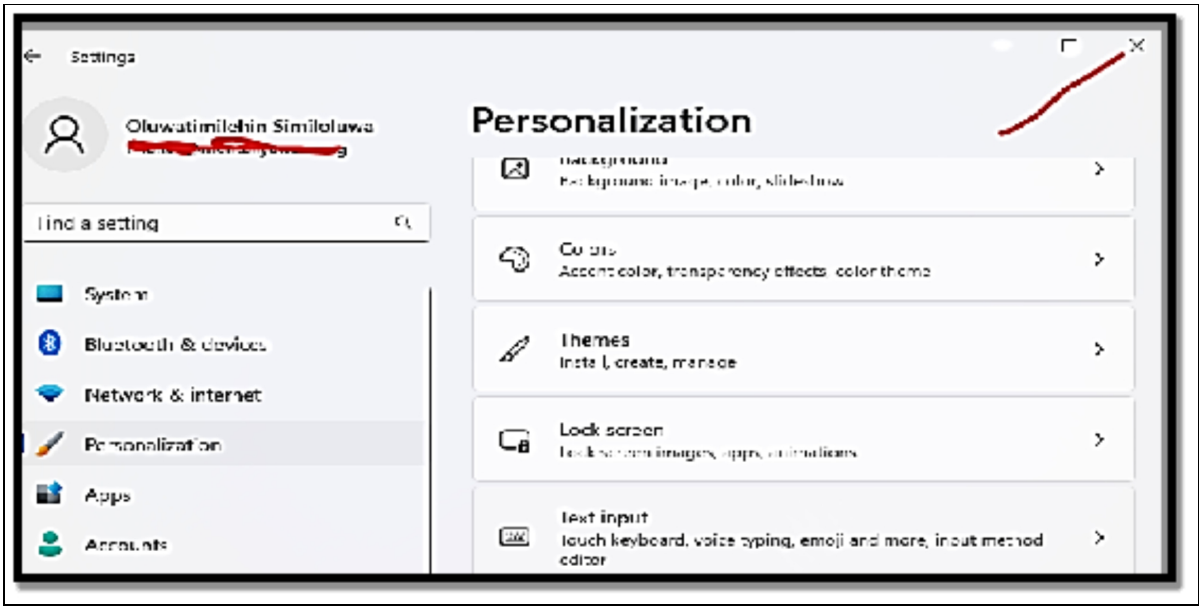
## Adding and removing taskbar items

You can choose to either enable or disable some of the icons on the Windows 11 taskbar. **Follow the steps below to add icons and take off icons from the taskbar;**

- Right-click or touch and hold down **anywhere on the empty space on the taskbar and select Taskbar Settings.**
- Beneath Taskbar items, toggle off the **switches of the icons** you would like to remove from the taskbar.
- If you have a tablet or a touchscreen, beneath **Taskbar Corner Icons,** allow the icons that you would like to see in the

right corner of the taskbar.

- When you are done, bring a close to Settings by selecting or touching **X in the top right corner.**




# Activity

1. Open your system and set it up.
2. Explore the Start menu of your system.
3. Make use of the Taskbar and System Tray.

# CHAPTER 3
# NAVIGATING WINDOWS 11

If you are an experienced user of Windows 7, you will find certain aspects of Windows 11 quite easy to navigate through; it is just as though these parts were taken from a Mac or an iPhone. I am sure you know how to get around certain basic settings with Windows with the previous knowledge you have. Navigating Windows 11 isn't so difficult, I will give you a quick tour around what you are expected to come across so this becomes an easy and seamless experience for you. In this chapter, you will also learn about basic shortcuts you can use to ensure navigation becomes much easier for you. When you make use of shortcuts, it helps with enhancing your creativity and also ensures you find your way around in a swifter manner.

## Navigating around the desktop

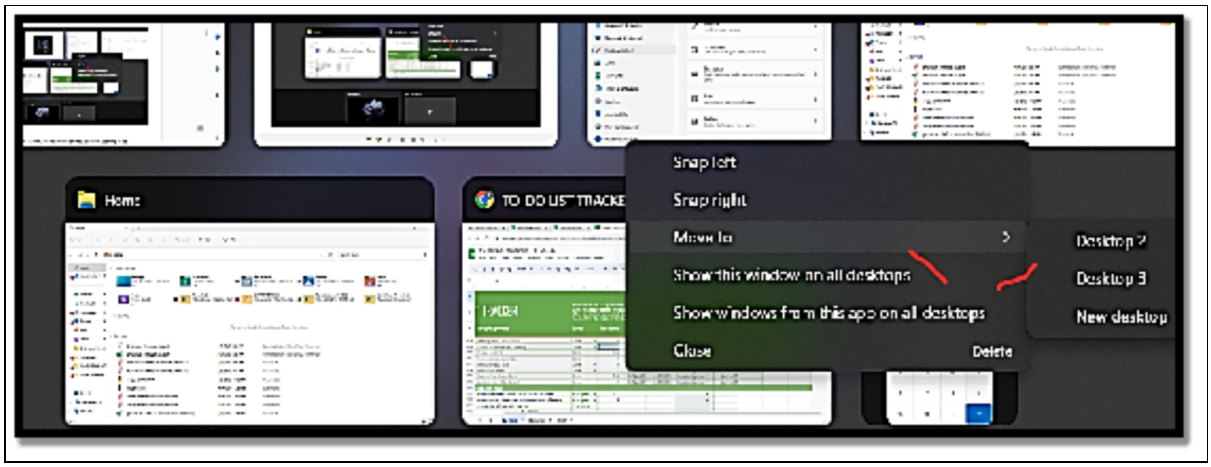
If you are making use of a mouse or using a trackpad or even if it is a finger, the desktop is the very place where you will likely be spending most of your time in Windows. Below is a well-guided tour of your PC, which you can do with just the use of a mouse, a finger, or even a stylus. Any choice you decide to go with, this guide will surely help you settle properly.

- Select or touch the **Windows logo icon (Start)** which can be found at the margin.
- Navigate to the pinned section, choose or touch **the Photos icon**.

- Look closely at the Photos app window; note that the size of this window can be modified when you drag your mouse cursor over to a specific edge and then **tap and drag**. You can ensure to choose to drag the whole window by selecting the title bar and then dragging it. Note also that you can choose to minimize the window by making it shrink down to just an icon by simply selecting or touching the horizontal line in the upper right corner. Finally, if you would like to close the app, all you need to do is select or tap the **X icon in the upper right corner.**
- At the lower part of the Window in the taskbar, close to the **Start icon**, choose or touch the search icon.

**Here you will be able to search for various applications, files, folders, and configurations as well as websites you might need to visit.**

- In the search field at the very top of the Windows, you can choose to type the word “photos”. The results will include various settings pertaining to searched words, web results, and files and folders in your computer that pertain to the word search.
- Select or touch the **New Desktop button at the top of the taskbar**. When you do this, another desktop (Desktop 2) will be created instantly and will be added to the list of virtual desktops. Any other application you open will then be added to the virtual desktop.
- Drag the mouse over **Desktop1**, right-click on **any page**, and then select **Move To > Desktop 2**.




**With this, you would have successfully moved the photos app from Desktop 1 to Desktop 2 which you have earlier created.**

- Select or touch **Desktop 2**.
- Inside the Photos app window, select or touch the **X button** in the top-right corner in order to have it closed.
- On the taskbar, choose or **touch the widget's icon**. Windows 11 widgets show quite a handful of useful information like weather forecasts, the latest news especially if you are a lover of sports, stock market data, and also traffic data.

# Keyboard Shortcuts

Windows 11 has lots of keyboard shortcuts. Some of these shortcuts have the ability to ensure your work is done in a much easier manner which definitely is the sole reason you are making use of a computer in the first place.

- **Ctrl +C**: This shortcut helps you to copy whatever it is you have highlighted with the use of your mouse. Once copied, it is positioned on the clipboard. You can also repeat this same process on a touchscreen; all you have to do is tap and hold down then select Copy.
- **Ctrl + X**: This option helps to cut anything you must have highlighted and also puts it on the clipboard. For the touchscreen option, you can also make use of the same options mentioned above but this time will touch the cut option and not copy.
- **Ctrl+V**: This option helps with the pasting of whatever you have either copied or cut and is in your clipboard. As usual, for the touchscreen option, you can simply touch and hold down the exact place you would like to paste and then touch the Paste option.
- **Ctrl+A**: This option helps to select everything. Although, there are times it can be very hard to differentiate certain things from “everything”.
- **Ctrl+Z:** This helps you to undo whatever you have just done. Oftentimes, this option is usually used when an error is committed.
- Whenever you are typing, Ctrl +B, Ctrl + I, and Ctrl + U often modify your text to bold, italic, or underline, respectively. Tap the same key combination once more and the text will then go back to normal.

**Below are some other one-touch shortcuts you also should be aware of;**

- The **Windows key** brings up the Start menu.
- **Windows +A** helps with the opening of Quick Actions.
- **Windows + E** opened File Explorer.

- Windows + I help with the opening of the Settings App.
- Windows + M minimize all open applications and windows on the desktop that is currently in use.
- **Windows+Tab** open the task view, with the virtual desktop listed at the bottom. In the middle, a preview of the applications opened can be found on each of the virtual desktops.
- **Alt + Tab**: This option helps you to move through all the applications running on the desktop in use one after the other.
- **Ctrl + Alt + Del**: A combination of these buttons brings up a screen that enables you to decide to lock your PC, change the user, sign out, or even execute Task Manager.

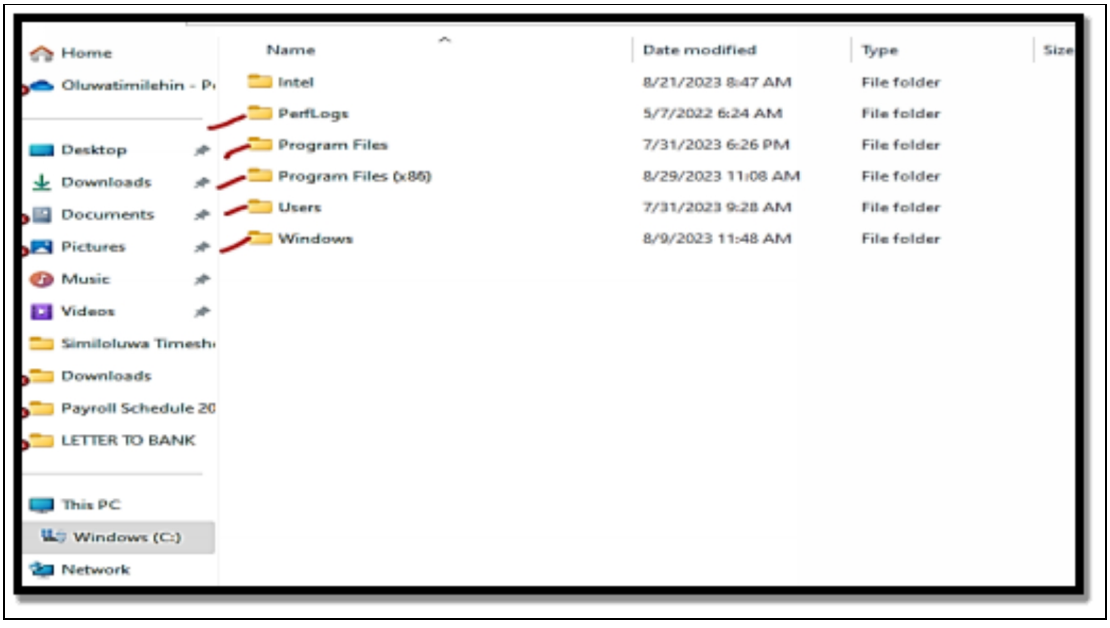
# File Explorer Basics

File Explorer in Windows 11 is a tool for navigating and managing files and folders on your computer. It offers a graphical user interface for interacting with your files, organizing them, copying, moving, deleting, and doing other file-related activities.

**The following are the fundamentals of utilizing File Explorer in Windows 11:**

- Opening File Explorer
  - Select the **Start button (Windows logo) in the taskbar.**
  - Choose **File Explorer from the Start menu** or you can also choose to tap the **Windows Key + E on your keyboard.**

- Navigation Pane
  - The navigation pane located on the left side shows Quick Access which are frequently used folders and This PC which are drives and storage devices.
  - Select **a folder** or drive to gain access to its contents.




- **Address Bar**
  - The address bar helps to show the current location of the folder you are currently in. You can also choose to type a path

or address swiftly in order to get to the specified location swiftly.

- **File Lists**
  - The File lists help to show the contents of the chosen folder. You can see files as icons, a list, details, and even thumbnails.
- **Ribbon Menu**
  - The Ribbon is usually located at the top and offers various options as well as tools for the management of files which includes; organizing, copying, moving, and deleting files and also modifying the overall view and layout of the file explorer.
- **Quick Access**
  - This option enables the display of folders that are frequently used and also recently opened files. Folders can be pinned for easy and swift access.
- **Context Menu**
  - Right-click on **a file or folder** in order to open the Context menu which provides different options like opening, copying, cutting, renaming, deleting, and a whole lot more.
- **Selecting Files and Folders**
  - Select **a file or folder to choose it.**
  - Hold down the Ctrl key **when choosing** if you would like to choose more than one item.
  - To choose a wide range of items, choose the first item, hold down the Shift key, and then choose the last item.
- **Organizing Files**
  - Open a new folder: Select the New **Folder button on the Ribbon**.
  - Rename: Right-click and then select **Rename** or you can also choose to tap **F2 on your keyboard**.
  - Cut, Copy, Paste: Right-click and then choose **your preferred choice between Cut or Copy; then right-click and select Paste at the very destination where you would like to have the item pasted**.
- **Searching for Files**
  - Make use of the search box located in the top right corner to locate files and folders.
- **File and Folder Properties**

    - Right-click on a file or folder and select **Properties** to see details about the specific item like its size, location, and attributes.
- **Changing Views**
    - Make use of the icons on the Ribbon or the View menu to modify the manner in which files and folders are shown such as icons, details, and thumbnails.

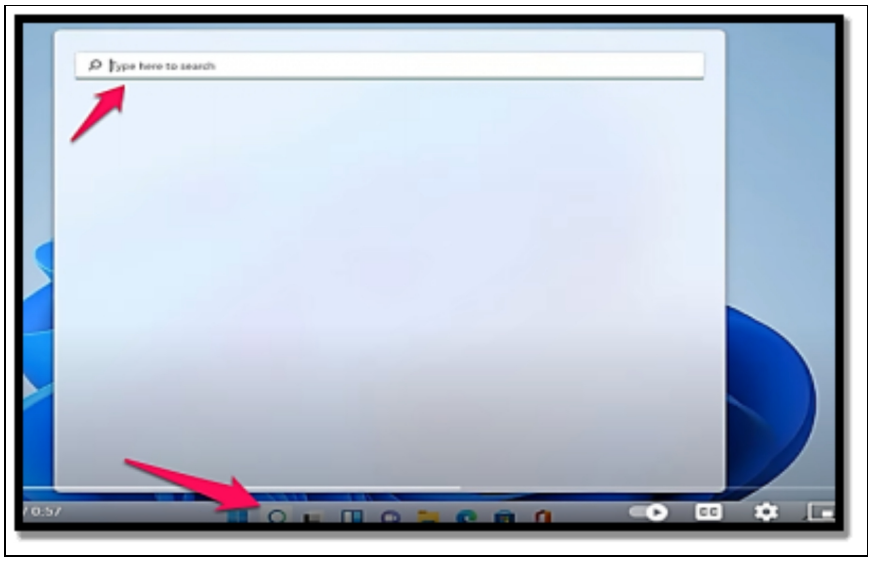
These are some of the fundamental capabilities and activities available in Windows 11's File Explorer. File Explorer provides a variety of tools and settings for efficiently and effectively managing your files.

# Using Windows Search

Windows Search has been around for over 15 years, beginning with the venerable Windows Vista. It has changed and matured over time, and the most recent version, Windows 11, is simpler, faster, and more efficient than earlier versions. Windows Search in this operating system can help you locate apps, settings, documents, images, emails, files, folders, and online results from a variety of sources, including your computer, the Bing search engine, OneDrive, OneNote, SharePoint, Outlook, and Mail.

**If you would like to open Search in Windows 11,**

- Select or tap **its icon**, which can be found close to the Windows logo, or you can also choose to **tap Windows + S on the keyboard.**



The Search pane in Windows 11 contains a plethora of useful links and settings. Starting at the top, you can narrow your searches by using the Type Here to Search area and the filters below it (All, Apps, Documents, Web, and More). Then there's Top Apps, a quick list of the Windows 11 apps you use the most. Finally, Recent displays a list of your most recently accessed items. The Quick Searches area appears next to Recent for users in the United States, the United Kingdom, and other countries. Bing, Microsoft's search engine, powers these.

**Below are the basics of how Search works in Windows 11;**

- Select or touch **the search icon on the taskbar**. Once done, Windows 11 will then show its Search page.
- Insert the preferred word you would like to search on your computer or device. The search results will then be shown and you would have to locate the results that best fit what you are searching for.
- Take a look at the panel to the right side of the **Best Match result**, and take note of the contextual options shown. If you would like to have an extension of this ist, select or touch the downward pointing arrow. This will help to expand the list and will include more options for what can be done with the Best Match result.

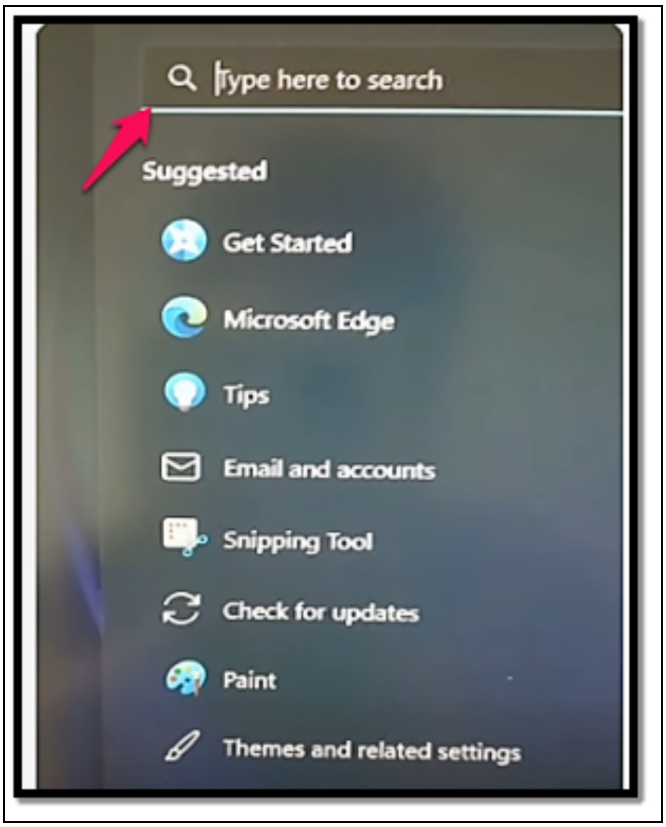
- If you would like to see more information about another search result, select or touch the right arrow close to it.
- Select or touch the Windows result or the specific search result that is of interest to you.

## Start apps swiftly

If apps are pinned to the taskbar of your Windows 11, you can start those applications very fast by simply selecting or touching their icon.

Nevertheless, when you pin too many items on the taskbar, it will then become very annoying to make use of as the taskbar will be too flooded with app icons. This is another unique place where the search icon can come to your rescue as it can be used to start any app you want in just a few seconds.

- Touch the **Windows key** on the keyboard of your computer; this will open up the **start menu.**
- Insert **the name of the application** you would like to have opened. Even if at that moment you cannot fully remember the full name of the application just type what you can remember.




- Tap **Enter on your keyboard** and the open will immediately open.

## Filtering search results to locate what you need

There are so many things that can be done with the search results in Windows 11; some of them are quite more useful than others. For instance, you might be searching for a specific setting that is stuck somewhere in the Windows 11 settings app. If you would like to locate whatever it is you feel you might have a need to search for faster, you can choose to make use of filters in Windows Search. **Follow the steps below to get this done with so much ease;**

- Tap the **Windows Key** on the keyboard of your computer or you can also choose to touch t**he search icon on the taskbar.**
- Type the word you would like to search for. For instance, I usually search for brightness because before I make use of the system there are times I need to adjust the brightness level.

- In the top-right corner of the Search window, select or touch **More**.
- In the filters ist, choose **Settings**.
- Click or touch the specific search result that is of interest to you.

## Starting apps as admin from a Windows search

Apps in Windows 11 operate with ordinary rights by default, which means they can't change operating system files or settings. Few people are aware that you may launch apps with administrator privileges through Windows Search rather than the Start menu. This enables apps to make any changes they desire. Assume you wish to run PowerShell as an administrator. **Here's what you need to do:**

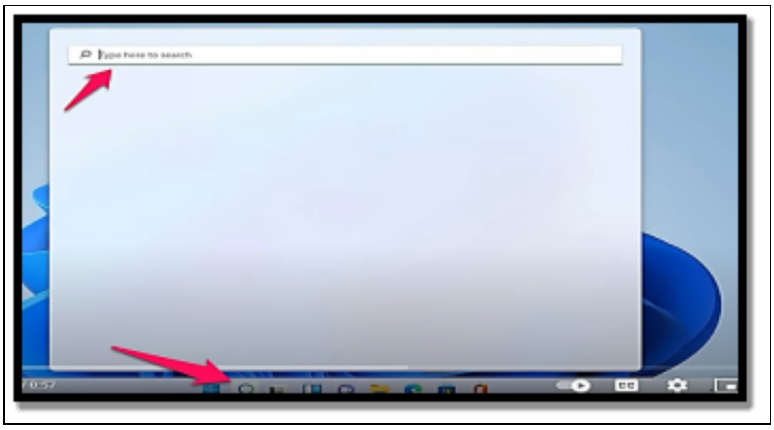
- Tap the **Windows key** on the keyboard of your computer or you can also choose to touch the **scratch icon on the taskbar.**
- Insert the word **PowerShell**. Windows search will then show the results divided by categories; best Match, Apps, Settings, and Search the Web.
- At the right of the Windows Powershell search result, choose or touch **Run as Administrator.** Windows 11 will inquire if you would like to permit this app to make changes to your device. These changes can be just anything from modification of system files to total revamping of Windows settings.
- Select or touch **Yes**

## Searching the whole PC

Windows Search only scans a select few locations on your Windows 11 computer or device while looking for files and folders, including your user folders, the desktop, and the Start menu. It won't search your other drives if your computer has several partitions.

**However, you can configure it in the following way:**

- Select or touch **the search icon on the taskbar.**



- In the Search window, select or touch **the three dots in the top-right corner**.
- In the menu, select **indexing options.**
- If you have a laptop or tablet, switch on the **Power Settings.** When Indexing Switch option by simply selecting or touching it. Once this has been done, this will ensure that anytime the device is not plugged in, Windows search will not be busy indexing a large number of files and draining up your power.
- Under **Find My Files**, choose **Enhanced instead of Classic.** Windows Search will now ensure all files are indexed on your PC, from all partitions, such that it can offer you a definite search result.
- Close Settings. Note that indexing might take some hours hence you shouldn't expect to see any sincere changes in your search results immediately after you have this setting enabled.

## Virtual Desktops and Task View

Operating systems (including Windows, macOS, and different Linux variants) provide a feature called virtual desktops that enable you to create and administer many separate desktop environments inside of a single physical computer. You may more effectively manage your open programs and windows by using each virtual desktop as a separate workspace.

**Below are the very many things virtual desktops can do for you;**

- **Multiple Workspaces**: Virtual desktops allow you to have various sets of applications and windows open and organized

into various workspaces. With this, you will be able to manage tasks, projects, or applications more effectively by having to group windows that are similar together.

- **Reduced Clutter**: As against having all your windows opened on just one desktop, you can have them spread out across various virtual desktops. This can also help with the reduction of clutter and hence ensure it becomes easier to focus on certain tasks.
- **Task Switching**: Switching between virtual desktops is often quite straightforward; it often involves the use of keyboard shortcuts or a graphical user interface. This also enables you to swiftly jump from one workspace to another without having a need to close or minimize windows.
- **Multitasking**: If you are working on various projects simultaneously, virtual desktops ensure it becomes a lot easier to change between sets of windows that are related without posing any confusion.
- **Customization**: Various operating systems offer varying levels of customization for virtual desktops. You may also be able to attach a name to your desktops, make a choice of another wallpaper, and configure certain behaviors for each of them.

To make use of virtual desktops, there is a need for you to create one.

**Follow the steps below for a comprehensive guide on what you should do to get this done;**

- Select or touch **the task view icon**. Task view shows the applications you have open and any desktops you have designed. Note however that the current desktop is Desktop 1.

- To create a virtual desktop, touch or select **New Desktop**. Desktop 2 will then be included in the list at the lower part of the task view.
- Select or touch **Desktop 2** in order to have it opened. Note that Desktop 2 as of this time is empty and has no application running in it.

- **If you would like to rename a desktop, follow the steps below;**
    - Select or touch **the task view icon**.
    - Right-click **the desktop** you would like to make use of and then click **rename from the contextual menu.**

- Insert a **name for the virtual desktop.** Tap **Enter** on your keyboard and you can also choose to click or touch outside the list of virtual desktops.

Note that if you right-click the name of a virtual desktop in Task View, you will be able to see the Choose **Background option**. You can then modify the wallpaper for just that desktop ensuring it becomes much easier to differentiate between them.

## Moving apps between virtual desktops

For virtual desktops to be very useful there is a need for you to be able to drag applications between them. **Below is how you can get this done;**

- Create **two virtual desktops**.

- Open Microsoft Edge by selecting or touching its **icon on the taskbar.**
- Select or tap **the task view icon on the taskbar.** The task view is usually shown with the Microsoft Edge window in the middle.
- Right-click or touch and **hold down on the Microsoft Edge app preview in task view**.
- Select **Move To**, and then select or touch the name **of the desktop you would like to move the window to.**
- Select or touch **the name of the desktop where you moved Microsoft Edge.**

## Activity

1. Highlight the basics of File Explorer.
2. With the use of Windows search, locate an application or a file.
3. Open a virtual desktop and also make use of the task view.

# CHAPTER 4
# PERSONALIZATION AND ACCESSIBILITY

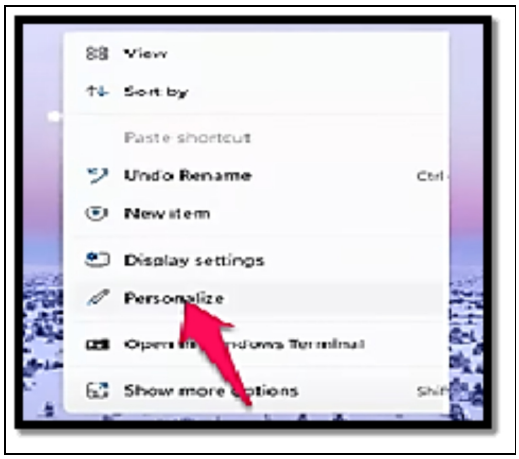
Personalization allows you to configure your computer to reflect your interests and routines. Customizing the interface's design, colors, and layout can make it more aesthetically appealing and easier to use, resulting in a more fun and efficient user experience. You can access frequently used apps and files more quickly by configuring your desktop, taskbar, and Start Menu to fit your workflow.

By lowering the time spent searching for goods, you can boost your efficiency and productivity. Adjusting font sizes, color schemes, and contrast settings, for example, can make your computer more accessible to those with visual impairments or other disabilities. Customizing the UI to your preferences results in a more comfortable and accommodating experience.

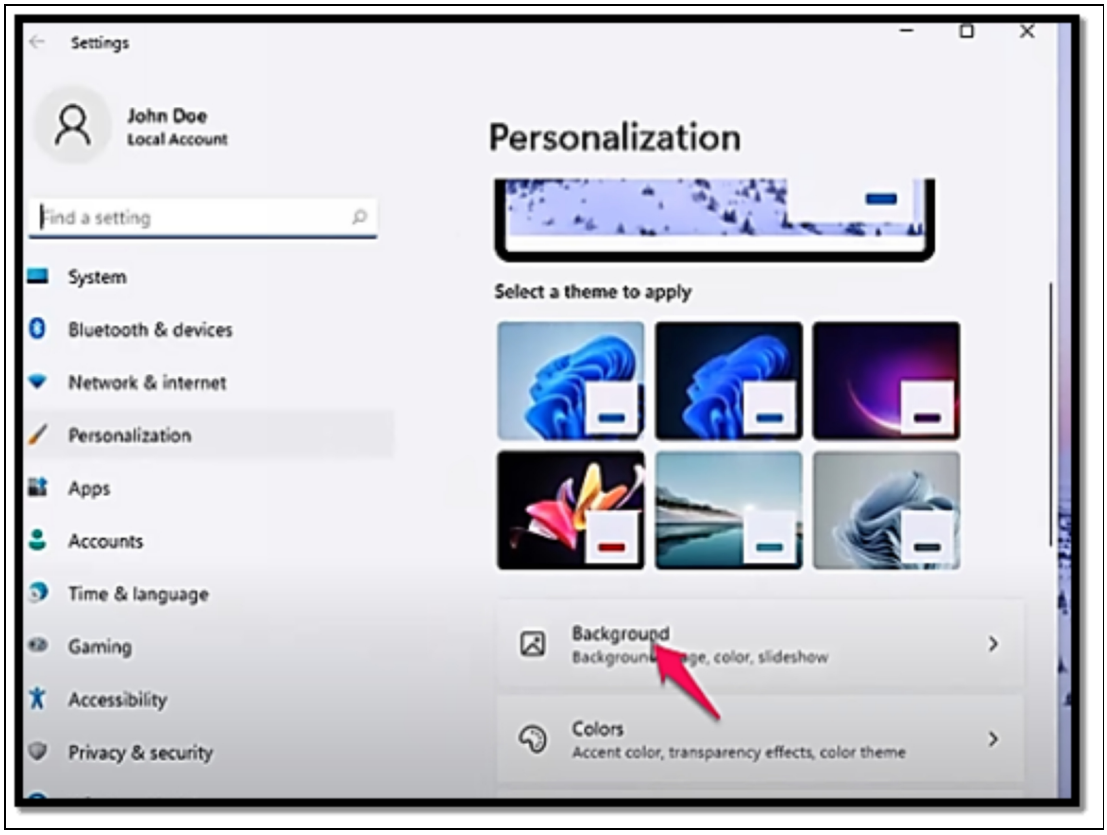
## Customizing Your Desktop Background

You choose to personalize your desktop background in Windows 11. Microsoft offers diverse options for modifying and personalizing your desktop wallpaper in order for it to suit your various preferences. Customizing your desktop in Windows 11 can provide a number of advantages that will improve your entire computing experience and make your interactions with the operating system more comfortable, efficient, and pleasurable.

- Right-click > **Desktop> Personalize>**




## Background




## Changing Desktop Wallpaper

**There are about three different kinds of desktop wallpapers that are supported in Windows 11. You can choose to modify your wallpaper via the personalization configurations.**

- Right-click an empty space on the desktop (ensure the icon is not on any application) and then choose Personalize. As an alternative, you can also choose to go to
    - **Start > Settings > Personalization**.
- Choose Background.
- Choose the **Personalize Your Background dropdown menu** and then select **Picture, Solid Color, Slideshow, or Windows Spotlight**.

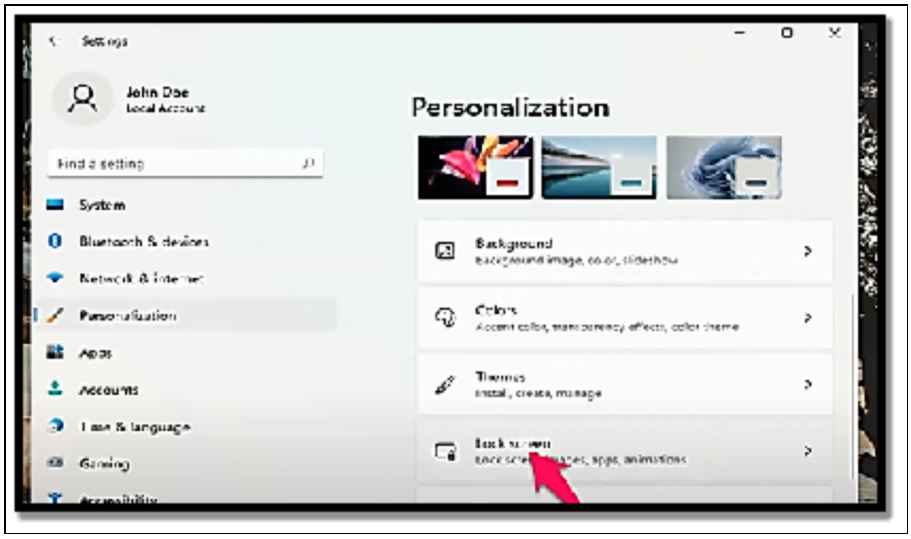
- If you decide to select Picture, choose one of them from the list, or you can also choose Browse Photos to choose another picture. You can also right-click a picture to choose which monitors you would like to use it on.

The solid color option shows a table of colors and a View colors button which you can make use of in finding the exact color you would like the wallpaper to be. Windows will automatically cycle through the photographs in your Pictures folder for a slideshow, but you can also select any other folder on your computer using the button there. Additionally, there are settings you may modify, like a shuffle toggle and a schedule for automatically changing the background. Microsoft-provided backgrounds is cycled through by Windows Spotlight.

# Changing Your Lock Screen Background

You may have taken note that changes to the desktop background don't affect the lock screen background. The lock screen is the very place where you insert your password to log in hence you would be able to see it before you sign in to Windows right before you even have a view of the desktop background. **The lock screen background is controlled by the whole separate configuration but this can still be changed with ease.**

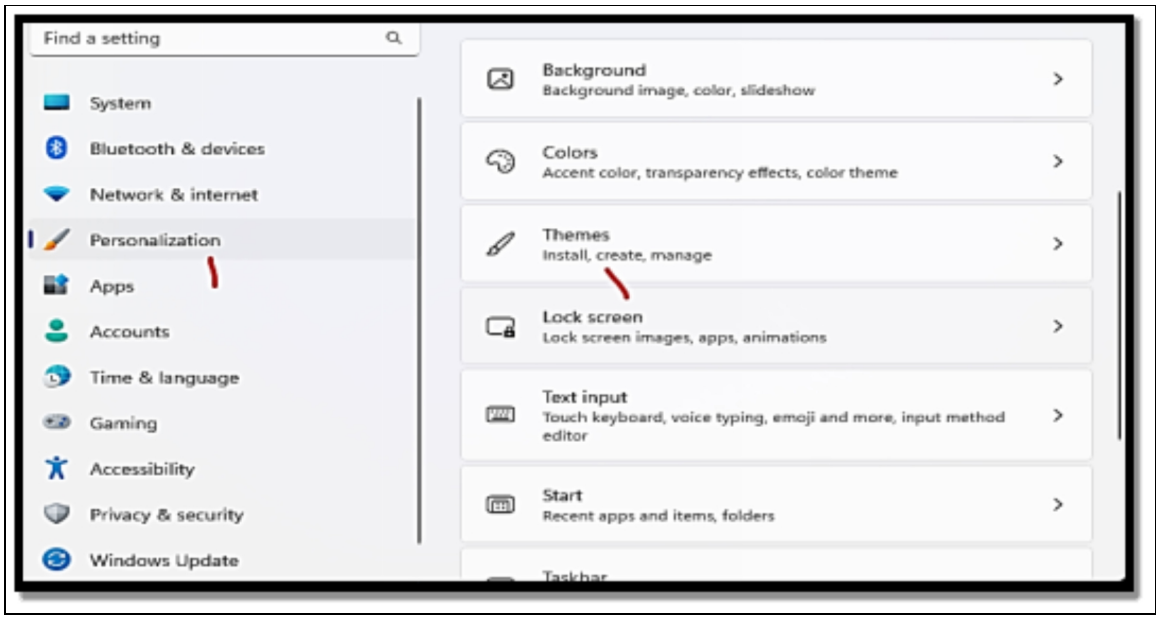
- Right-click an empty space on the desktop and choose Personalize, or you can also choose **Start > Settings > Personalization**.
- Choose **Lock Screen**.




- Select an option from the **Personalize your lock screen menu:**
    - Windows Spotlight instantly modifies the background to pictures chosen by Microsoft.
    - Picture ensures the background is any picture you choose from your computer.
    - Slideshow travels through pictures of your choice which is also based on the folders you choose.

**You can also choose to remove a background from the desktop background; all you have to do is**

- Go to the **Wallpaper folder, right-click the background** you would like to take off, and then choose **Delete**. If you would like to remove a custom photo, get through to the image file and follow the same steps as above. If you would also like to delete a Windows theme, right-click the theme from **Settings > Personalization > Themes and then choose Delete.**




## Additional Tips

- You can also choose to make use of various images as the slideshow for your desktop background. All you have to do is click on the Slideshow option in the Background settings and then choose the folder that has the images you would like to employ.
- Windows 11 also provides unique and dynamic themes that can alter the desktop background depending on the location and the time of the day. You are able to find these themes in the Background settings.
- If you would like to further personalize your background, you can choose to customize the lock screen background differently from the desktop background. You can get this done

in the Lock screen configurations that are in the Personalization section.

- For much more advanced customization, you can choose to explore third-party wallpaper and background management tools available from the Microsoft Store.

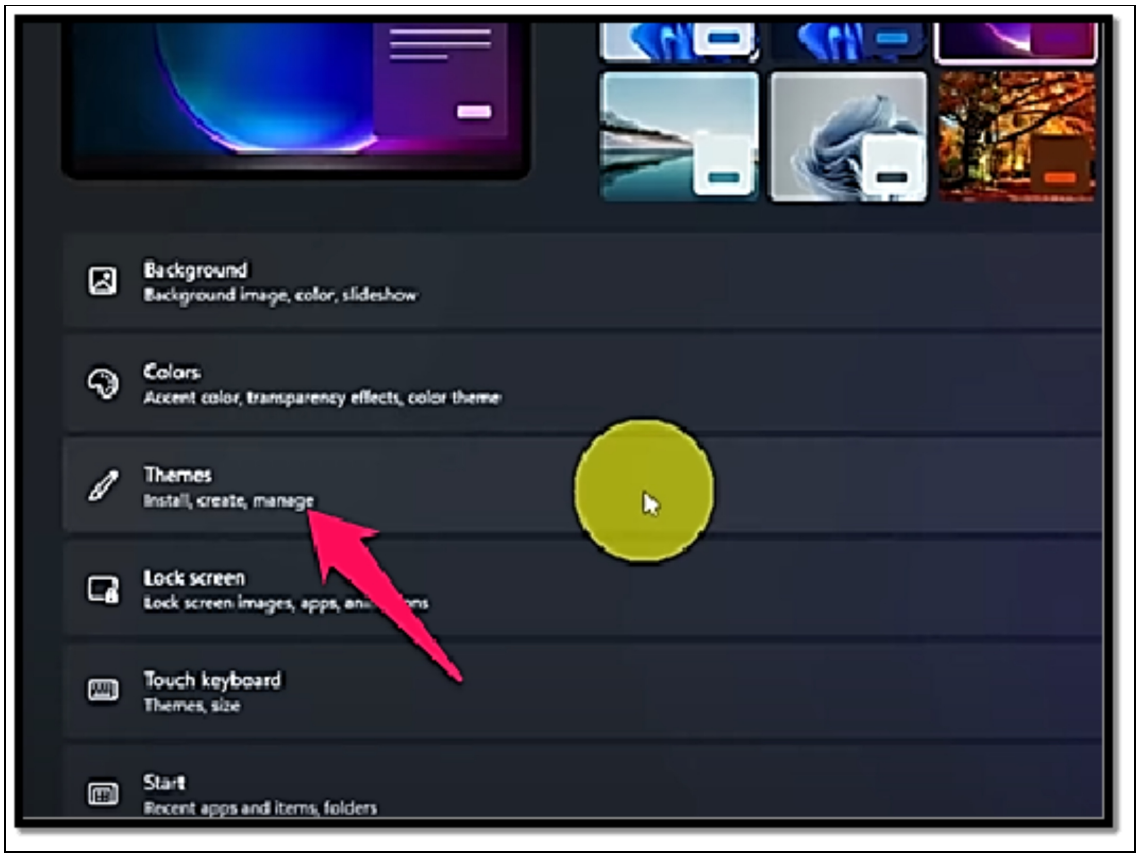
## Themes and Accent Colors

In Windows 11, themes and accent colors enable you to personalize the look of the user interface in order to ensure it is more appealing visually and also aligns with your preferences. Themes encompass a combination of various desktop backgrounds, colors, sounds, and some other visual elements, while accent colors basically affect the color accents that are used throughout the operating system.

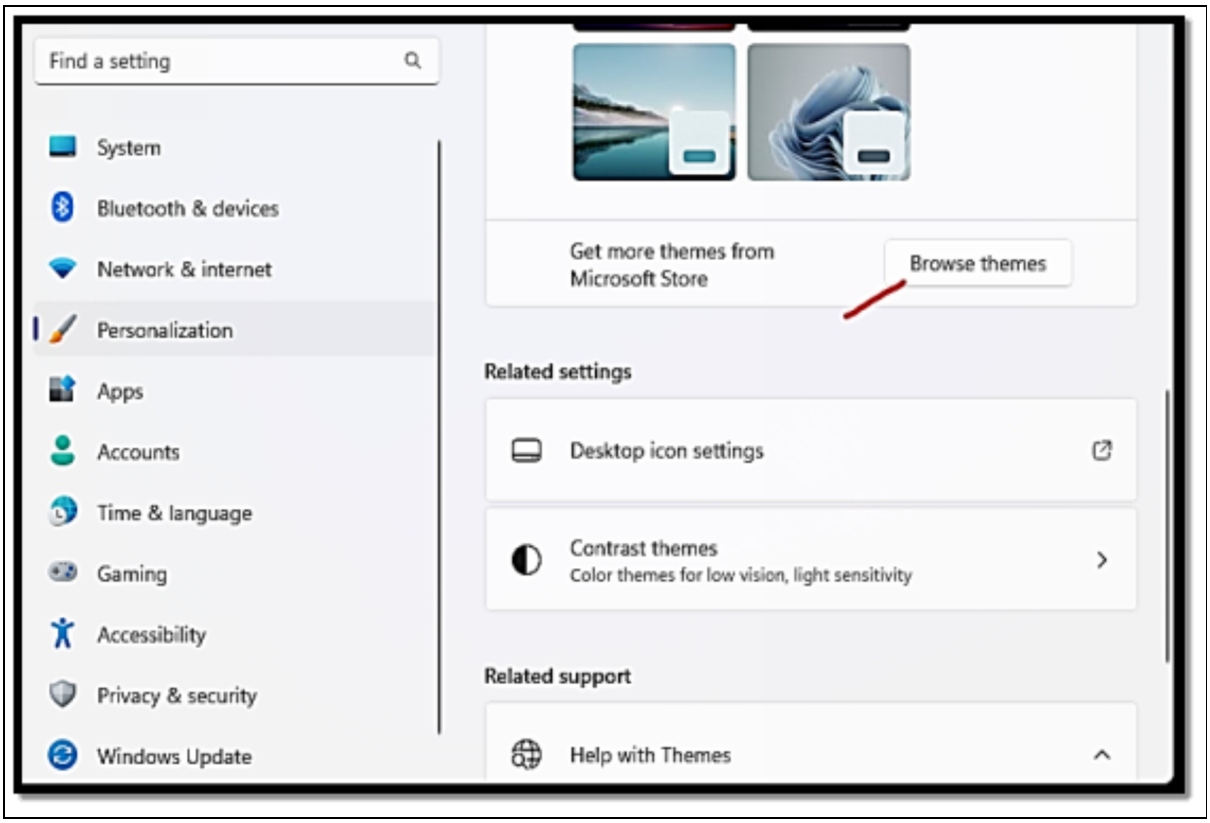
## Themes

**Follow the steps below to choose a theme for Windows 11;**

- Choose **the Start button (Windows logo) in the taskbar**.
- Choose **Settings (the gear icon).**
- When you get to the Settings window, choose **Personalization.**
- Choose **Themes in the left sidebar**.




- Beneath the Choose **a Theme option**, a list of predefined themes will be shown. Choose a theme to preview before you make a decision if you would like to choose it or not.



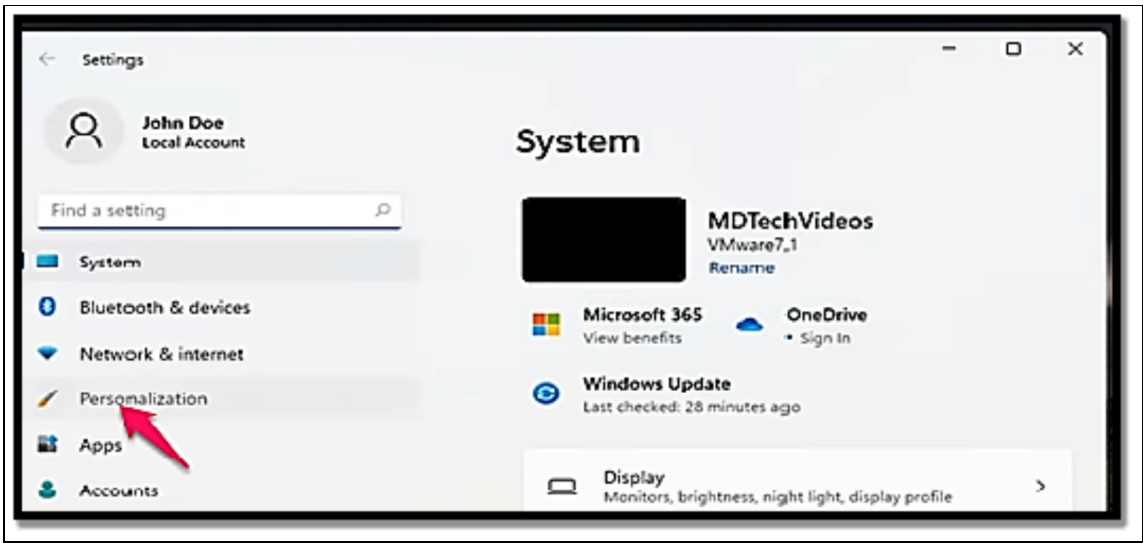

You can also choose to personalize themes by making changes to the wallpaper, colors, and sounds that are in sync with the theme. To get this done, choose the theme you would like to personalize and then choose the **Customize button**. Once that is done, you can make a choice of different wallpaper, accent color, and also the sound scheme. If you would like to create your own custom theme, you can choose your preferred desktop wallpaper, colors, and sounds. Upon the personalization of these elements, choose the Save a copy option to ensure your custom theme is saved.

## Accent Colors

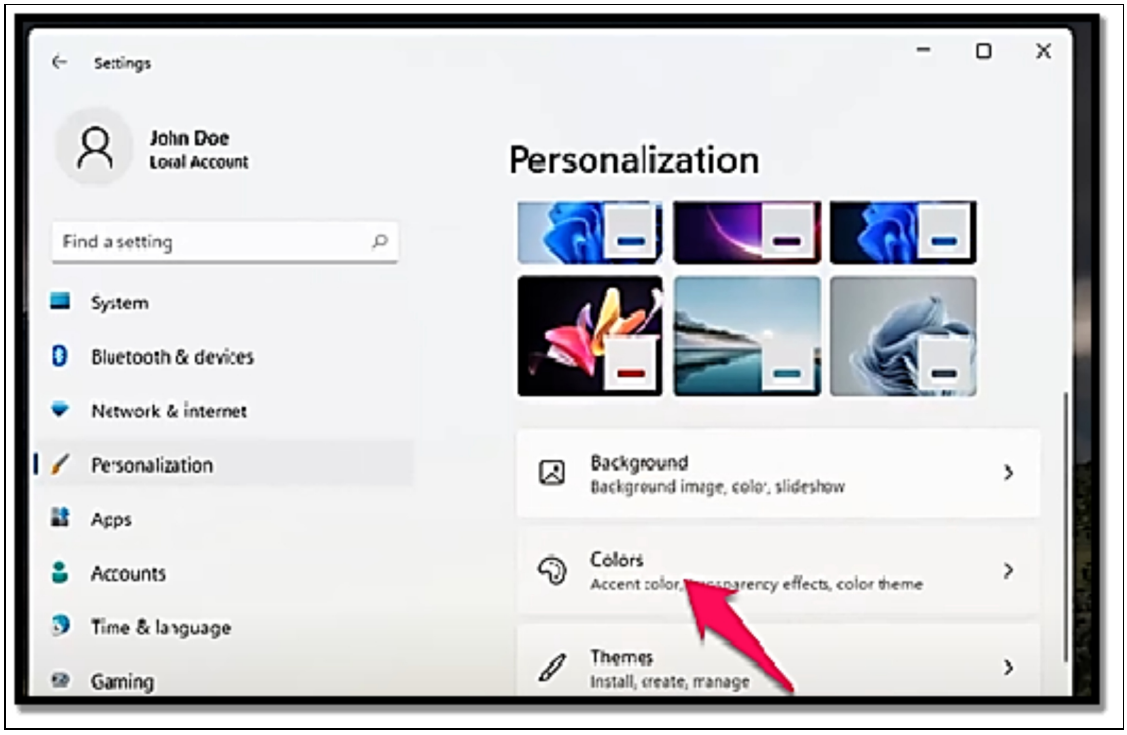
Accent colors are used in the highlighting of some elements like buttons and borders all through the Windows 11 interface.

**If you would like to make a choice of an accent color, follow the steps below;**

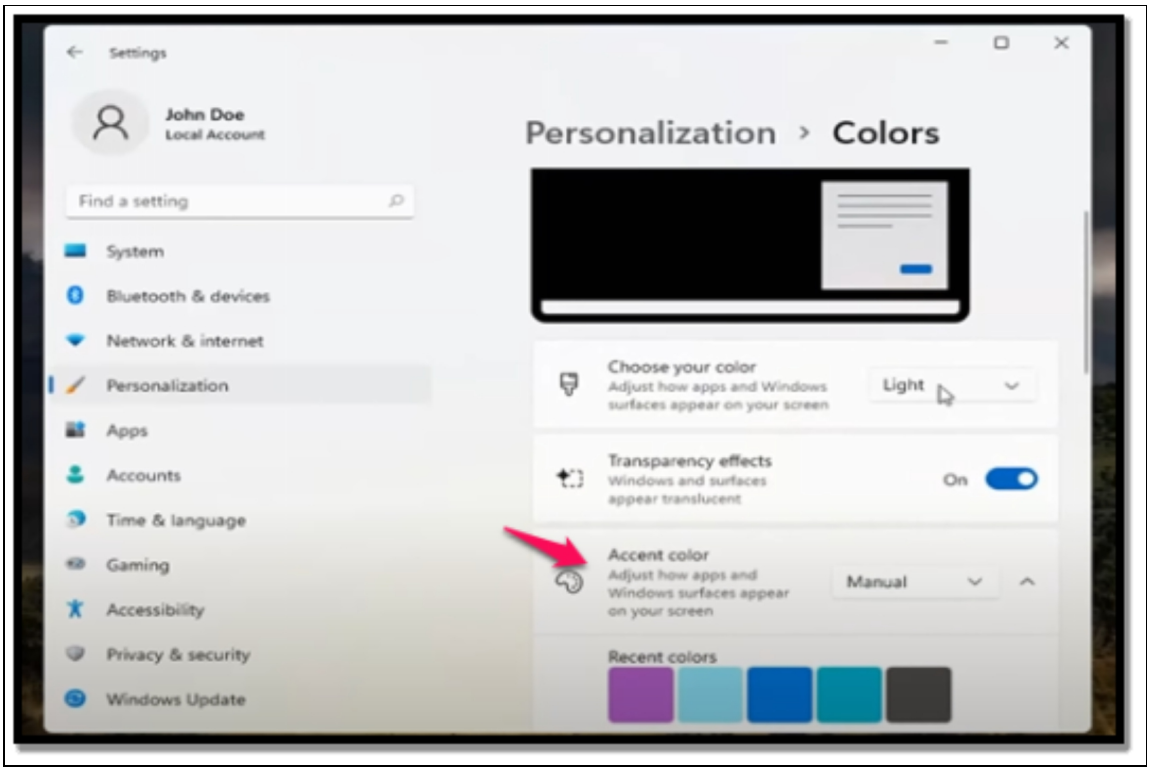
- Navigate to **Settings > Personalization**




**> Colors**.




- Beneath **Choose your color**, you can choose a predefined accent color or make a choice of any custom color you would prefer to make use of.




You are also free to enable the automatically pick an accent color from my background" option. Once done, Windows 11 will proceed to pick an accent color depending on the wallpaper you are using at the moment. Windows 11 provides various accent color effects like Transparency effects and shows accent color on the Start, taskbar, and Action center. All of these options mentioned will enable you to gain control of just how the accent color is added to different interface elements.

You may build a unique and visually appealing computing environment in Windows 11 by selecting themes and accent colors that reflect your preferences. These customization options enable you to personalize the operating system while improving the overall user experience. In conclusion, themes and accent colors are critical in personalizing your Windows 11 interface. They influence the operating system's aesthetic attractiveness, organization, and usefulness, allowing you to build an environment that meets your tastes and improves your entire computing experience. You may make your computer feel more welcome, pleasurable, and

distinctively yours by selecting themes and accent colors that speak to you.

## Accessibility Features for seniors

Just like they do with PCs running other operating systems, elderly individuals do utilize computers running Windows 11. As technology becomes more pervasive in daily life, the adoption of technology among older people has been rising gradually. For a variety of reasons, including communication, information collecting, entertainment, and maintaining relationships with family and friends, many older folks use computers and the internet. Although there may be some differences in older people's comfort and familiarity with technology, it's crucial to remember that age alone does not determine whether or not a person uses a computer. Many senior citizens have developed their computer skills and tech knowledge, and they appreciate the advantages that technology may have in their lives.

Operating systems like Windows 11 and other software programs frequently include accessibility features and user-friendly interfaces to encourage older individuals to utilize computers. Older folks may find it simpler to connect with computers and complete activities thanks to these features.

**Here are a few Windows 11 accessibility features that can be especially helpful for senior citizens:**

- **Ease of Access Center**: This is a very centralized hub wherein various users can gain access to different accessibility settings and features. It offers swift access to tools that can be used for the enhancement of the user experience for various individuals having varying needs.
- **Magnifier**: Magnifier makes portions of the screen, text, images, and other content appear bigger and also easier to see. It can specifically be useful for individuals who have low vision or difficulty reading little text.
- **Narrator**: This is a screen reader that helps to read text, buttons, and some other elements on the screen aloud. This

can be of good assistance to seniors who perhaps are visually impaired by offering spoken feedback while also enabling them to move through the operating system and other applications with ease.

- **High Contrast Mode**: The high contrast mode helps with the modification of the color scheme to high contrast which ultimately can lead to an enhancement of readability and visibility for users that have low vision or color blindness.
- **Font and Text Size Customization**: With Windows 11, users are allowed to personalize the size and style of system fonts, ensuring that text becomes more legible, this can be very useful for people who have difficulty in reading standard text sizes.
- **Keyboard and Mouse Settings**: Windows 11 provides various options to customize keyboard and mouse configurations which also includes adjusting key repeat rates, enabling sticky keys as well and the configuration of various pointer schemes. All of these options can be of immense benefit to people especially older ones who might have motor skill challenges.
- **Speech Recognition**: Speech recognition enables various users to have a personal interaction with the applications in the computer as well as control the computer. This feature can be used to assist various people who might have some difficulty with typing or making use of traditional input options.
- **Larger Cursors and Pointers**: With the use of Windows 11, users are able to increase the size of cursors and pointers, ensuring that they become more visible and are also easier to track on the screen.
- **Subtitles and Closed Captions**: Subtitles as well as closed captions can be enabled in applications that offer support for it, this can be of immense help to users who have hearing impairments; it can assist them in following audio content.
- **Reading View and Immersive Reader:** With Windows 11 comes Reading View and Immersive Reader in applications that support it. This feature includes text-to-speech, adjustable text spacing, and customizable fonts which can make on-screen reading much easier.

- **Focus Assist**: This feature enables users to customize notifications and alerts, bringing about the reduction of distractions, and also aiding individuals to remain focused on tasks at hand.
- **Sticky Notes and Sticky Keys**: Sticky notes enable various users to create digital notes that can remain on the screen for a long time. It helps with reminding users of certain information they are likely to forget. Sticky Keys can also be of immense help to users who have difficulties tapping various keys at the same time.

These are but a few illustrations of the accessibility features that Windows 11 offers. Microsoft is dedicated to making its operating systems more accessible so that it can serve a wide range of users, including older people who might have particular needs or difficulties.

# Activity

1. Change your Desktop background.
2. Make a choice of Themes and Accent colors.
3. What are the various accessibility features for seniors?

# CHAPTER 5
# WORKING WITH APPS AND PROGRAMS

Apps which are the short form for applications and programs are known to be software applications that are created to execute some specific tasks or functions in the computer. These applications are designed so that they can be of immense help to users in accomplishing various forms of activities; from word processing and communication to productivity as well as entertainment. Although these terms are often used interchangeably, there are usually certain differences between them. In the section below, you will learn about the major differences between them.

Programs basically are a more general term that can be used to describe any form of executable software code. It encompasses a very wide range of software applications which also includes system software and application software. System programs are software that aids the management and control of the hardware and the operating system of the computer. Examples of this option include; operating system components, drivers, and utility programs that help with the maintenance of tasks. Application programs which are also known as applications can be described as specific tasks or functions. They are the tools that users make use of in their interaction with various activities on the computer.

Applications on the other hand can be described as software that is often downloaded from stores; they help with performing specific functions. The term apps have now become widely used with the recent rise of mobile computing, but it can also be used to refer to software applications that are used on desktop and laptop computers. To summarize, apps and programs are both software applications that provide distinct functions. "Programs" is a larger term that includes all sorts of executable software, whereas "apps" is more commonly linked with mobile devices and more sophisticated user interfaces. Regardless of terminology, both apps and programs

serve an important part in allowing users to engage with and utilize the capabilities of their computers for a variety of tasks and activities.

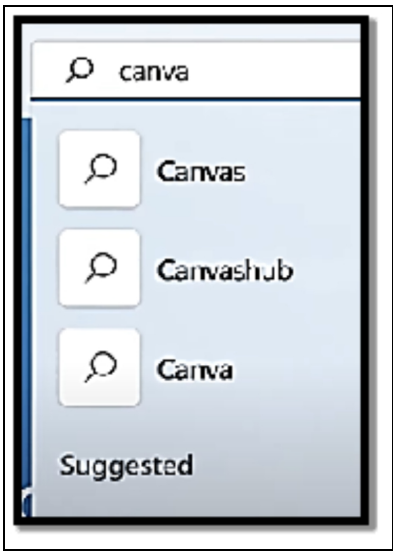
## Installing and Uninstalling Apps

The main purpose of installing an application on a computer is to include new functionality, features, or tools in the operating system, enabling you to do certain tasks or activities. Applications are created for the enhancement of the capabilities of your computer and also for the provision of tools that can aid in the accomplishment of your set goals. Applications are designed to assist you in doing various jobs and activities in a more effective manner. Word processing software, for example, allows you to produce and edit documents, whereas picture editing software allows you to change and enhance photographs. Games, multimedia players, streaming platforms, and e-book readers are examples of applications that provide enjoyment. These apps allow you to unwind, have fun, and consume numerous sorts of media. Utility programs carry out particular tasks like system maintenance, data backup, security scanning, and so on. These tools aid with the smooth operation of your computer and the protection of your data.

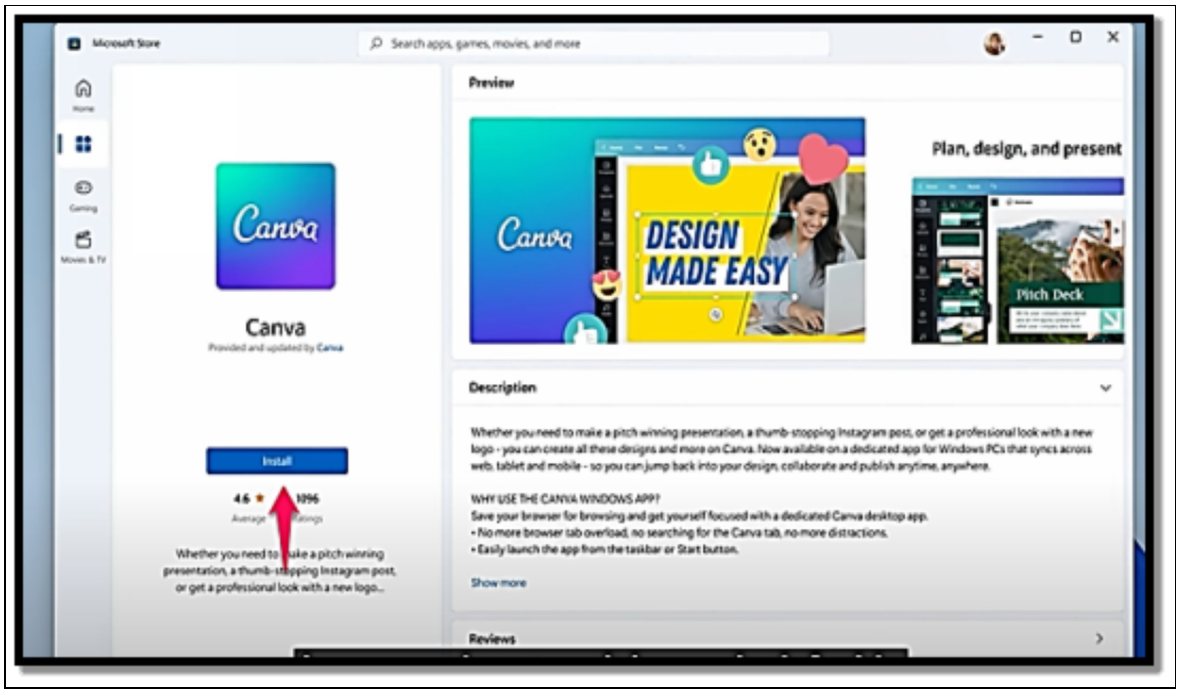
The Microsoft Store is the main source for installing applications in Windows 11.

**Go through the following steps;**

- Select the **Start button in the taskbar**.
- Locate **the Microsoft Store** and then choose it in order to open the store.
- With the use of the search bar in the **Microsoft Store**, locate **the app** you would like to install by typing the name of the app in the search bar.




- Choose **the icon of the application** in order to see the details.
- Tap or select the **Install button** to commence the installation process.




- Follow any on-screen prompts in order to complete the process of installation.
- Upon the installation of the app, you will be able to locate the icon of the app on the **Start Menu, taskbar, or desktop; this is however based on your settings**.

**To uninstall any application, follow the set of instructions below;**

- Right-click on the icon of the app in the start menu then click on the **Uninstall option from the context menu.**
- You can also choose to select the **Start button, choose Settings, and then locate Apps > Apps & Features**. Once done you can select the app and then choose the Uninstall button and follow any on-screen prompts in order to complete the uninstallation process. Lastly, confirm the app you would like to **uninstall.**

Another very fast option is for you to just scroll to the list of applications, right-click on the **very app** you would like to uninstall, and then click on the **Uninstall button**. Evaluate the impact on your workflow and any associated data before deleting an application. Some applications may have preferences or data that you would like to keep or backup before removing. Remember that, while the instructions above provide a broad guideline, the specific process may vary slightly depending on the app and the version of Windows 11 you're using, though it should work just well with any version.

## Getting Apps from the Web

Using Windows alone will not allow you to be productive or have fun with your computer. Yes, you may fill many hours of your day with built-in apps and browsing the web with Microsoft Edge. However, you may need to work with a variety of documents (such as PDF files), as well as cloud-storage apps that aren't included in OneDrive, apps for watching movies, desktop apps for unzipping file archives, and other tools. Users download Windows programs, or desktop apps, from a variety of sources, including torrents, peer-to-peer file-sharing clients such as eMule or Napster, and legal and safe download sites such as the Microsoft Download Center.

The new and updated Microsoft Store includes more apps than ever before, but you might not discover the programs you're looking for there. Then there's the drama of exploring the web for your favorite apps, downloading them from a safe location, and ensuring that

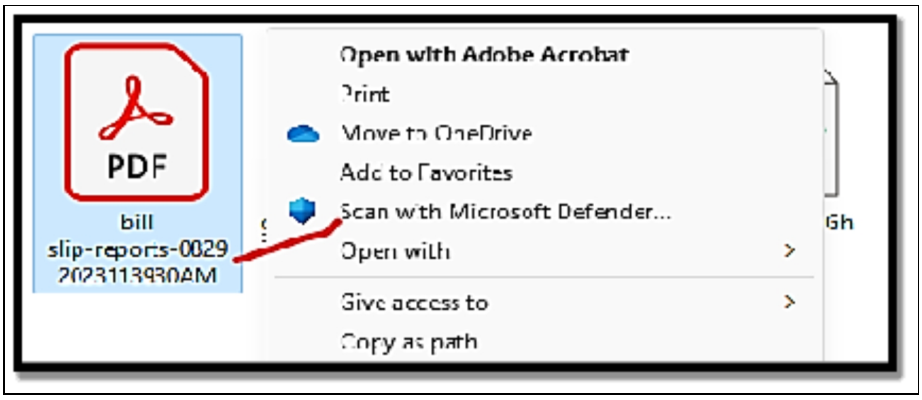
they're safe. Microsoft Store is your go-to place for Windows 11 apps and desktop programs - whether they be traditional desktop programs or modern mobile applications. All apps reviewed by Microsoft ensure you only install what you want without unneeded bundles and advertisements clogging up your device. Furthermore, this store automatically updates desktop applications without any effort needed on your part! Unfortunately, the Microsoft Store may not contain your desired desktop app; to find it more quickly you may wish to perform an internet search for its name. In such a situation, searching is your best bet in finding it and downloading it directly.

Be careful when downloading apps from outside the Microsoft Store. For maximum safety, always download from its official site; third-party download sites like softonic.com or filehippo.com can be frustrating experiences full of ads that promote downloading something else than what you desire - for instance, if you wish to download Adobe software it is much more beneficial if you visit their official website than use a third party download website such as Softonic or file hippo. If you wish to obtain Adobe apps it would be more prudent for you to utilize Adobe's official website than make use of any third-party websites like Softonic or file hippo. If you want to verify that a file or app you just downloaded is safe to use, run an antivirus scan.Navigate to www.virustotal.com and upload your desired file for analysis by all major antivirus programs - such as Symantec, Bitdefender, Avast, and TrendMicro among many others - then view its summary report. If for any reason, you feel that making use of VirusTotal will be too tedious for you or will consume lots of time, Windows Security can be another perfect option for you.

**Below is how to make use of it in checking if a file you have downloaded is secure or not;**

- Open **File Explorer and then click twice on downloads** or tap downloads twice if you are making use of a touch screen device.
- Right-click **or touch and hold down on the file** you would like to check and then select **Show More Options**.

- Select S**can with Microsoft Defender**. The Window Security app will then be launched and it will show the results of a scan and will also inform you if it found any form of threat inside the file it scanned.




If Windows Security informs you that a threat was found inside the file you scanned, ensure you delete the file instantly. Ensure you never run such a file because it is highly likely that it contains malware like a virus or trojan that can cause serious harm to your device or even damage it.

## Using Microsoft Store

Most of the features available in the Microsoft Store are recognizable to those who have purchased software from the Apple App Store or the Google Play Store. However, the App Store and the Play Store have a greater range, breadth, and quality of apps. The explanation

is straightforward: money. Because the App Store and the Play Store have so many more users, cool apps and games can make you a fortune.

Although the Microsoft Store used to primarily carry Windows apps (built to perform equally well on touchscreens as they did with a mouse and keyboard), it now includes a wide range of software, including desktop programs and progressive web apps. You can also purchase games, movies, and television series. Apps can make or break a computer these days, and Microsoft is well aware of this. That's why some popular programs may be found in the Microsoft Store – it's good for you and good for Microsoft.

The Microsoft Store in Windows 11 looks and functions well than it did in Windows 10. In addition, the Microsoft Store will eventually provide Android apps that run with Microsoft's operating system. It's time to start from the beginning. In this part, you will learn how to explore the Microsoft Store, install apps, and uninstall apps.

## Surfing the Microsoft Store

Anytime you are ready to make use of the Microsoft Store for your Windows 11 apps, open the Start menu and then choose or touch the Microsoft Store shortcut. Navigating around in the Microsoft Store is not so difficult; the column for navigation on the left has shortcuts to various types of content such as apps, games, and movies. On the right side, you can see the content itself arranged by various categories and offers.

**Below are various hints that can help you find your way around the Store with ease and then locate what you are looking for;**

- You do not have a need for a Microsoft account to get around the Store beyond basic searching and browsing as you did with Windows 10. Microsoft has helped to take off this impediment and now both local and Microsoft accounts can have the same

experience if they happen to stick to free apps, games, and content.

- If you would like to order an app or a game, choose or touch the name of the application. Once done, Microsoft Store will then take you directly to the screen where you will be able to place your order. At the top of the app is its price. You can also scroll down to screenshots of the application, a description of the app, ratings from other people who might have downloaded and used the app, and the system requirements for using the app. This will help you know if your PC can execute such an application or not.

You can also choose to make use of the categories option to swiftly locate apps. If you navigate downward to the Apps section, you will be able to see all types of categories designed by Microsoft: Top Free Apps, Essential Apps, Best Productivity Apps, and lots more. When you read the system requirements of the apps you wish to install from the Microsoft Store, you'll note that some state "Architecture: neutral," while others say "Architecture: x64," and yet others say "Architecture: X86 X64 ARM." Those marked "neutral" are Progressive web apps, those marked "x64" are standard desktop programs, and the rest are Windows 11 apps.

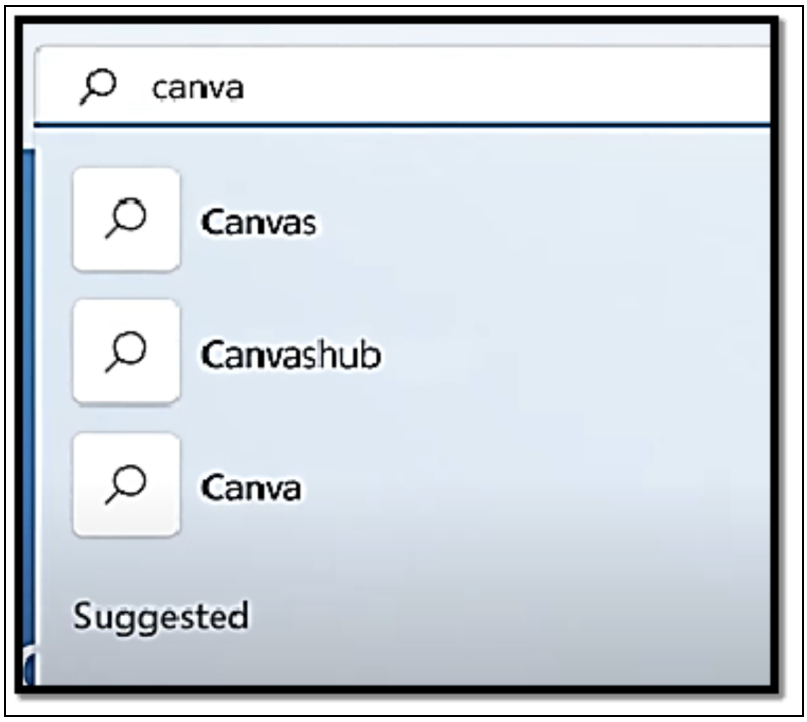
A revolution is underway, with web apps running in browsers giving way to web apps running outside of browsers, hosted web apps being brought down dynamically on execution, and progressive web apps blurring the boundary between web-based apps and native apps. Progressive Web Apps (PWAs) are a genuine attempt to make browser-based applications look and feel more like traditional apps. You've probably never seen a PWA in action, but they're here, even in the Microsoft Store. Twitter and Facebook, for example, provide PWAs rather than native Windows 11 apps. Any organization that does not wish to develop a Windows app can easily create a PWA. The theoretical advantages of PWAs are intriguing. For starters, Windows 11 apps can only run in the bare-bones Windows 11 environment. PWAs, on the other hand, should be able to run on any device that can run a browser, preferably Chrome or Chrome OS. Yes, Chromebooks are included.

# Installing Apps from the Microsoft Software

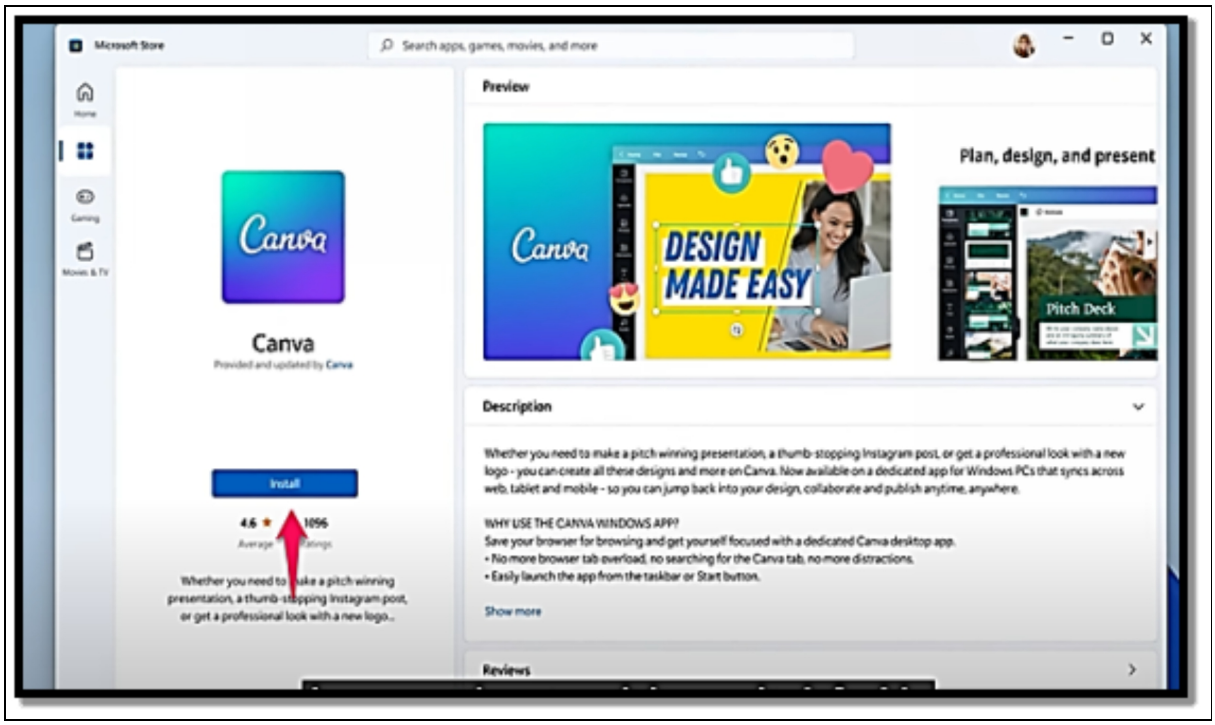
If there is a need for you to locate a specific type of application in the Microsoft Store, you can locate it with the use of the Search box at the top, or you can also choose to browse the built-in categories.

**Below is a set of instructions you should follow in order to have a free application installed like WhatsApp or VLC media.**

- Choose or touch the **Start icon and then the Microsoft Store icon.**
- In the Search box at the top, insert **the name of the app** you would like to search for.




- Select or touch **the specific name of the application you would like to download.**
- Select or touch the **Get or Install button**. Once this has been done, you will instantly see a bar indicating the progress of the application download and installation. You can choose to minimize the Store and get something else done while the store takes care of the whole downloading process.




Upon the completion of the installation process, the shortcut of the application will be displayed in the **Start menu's All App list or in the recommended section.** If you happen to be installing a desktop program from the Microsoft Store, at a point while the installation is ongoing, you may see a User Account Control (UAC) prompt, which will request that you let the application perform some system changes. If you do not click or touch Yes, it will lead to the failure of the installation process.

## Multitasking with Snap Layouts

Snap Layouts is a Windows 11 feature that lets you easily organize and manage several open windows on your desktop. You can simply organize and snap windows into multiple predefined layouts using Snap Layouts to maximize your multitasking experience. This function allows you to make the most of your screen real estate by placing and resizing windows efficiently for increased productivity.

Snap Layouts includes many pre-configured window layouts, making it easy to work with multiple apps side by side or in a grid layout. This functionality is especially helpful for users who frequently

multitask, work with many applications at the same time, or need to compare data from various sources.

**Below is information on how you can make use of Snap Layouts in Windows 11;**

## Snapping Windows

If you would like to snap a window to a certain layout, all you have to do is move the window to the edge of the screen. Once you are getting to the edge of the screen, a preview of the layout window you will be snapping into will then be shown to you. Let go of the mouse in order to snap the window into the layout you must have chosen.

## Preset Layouts

Windows 11 provides various preset layouts like side-by-side, quarter-grid, and lots more. These layouts instantly resize and position windows in order to become a perfect fit for the chosen configuration.

## Window Management

There is also an option for you to make use of the maximize and restore option on a window for you to gain access to a dropdown menu that provides you with various layout options for that specific window.

## Multitasking

Snap Assist is yet another feature that works in sync with Snap Layouts. Anytime you snap a window to a certain layout, Snap Assist shows a list of some other windows that you can snap into the rest of the empty spaces with so much ease.

## Customization

In addition to the layout of presets, you can also choose to modify the size and change the position of the windows within a layout such that it falls in sync with your preference.

# Snap Assist

Snap Assist is one other feature that works in sync with Snap Layouts. Whenever you get to snap a window to a certain layout, Snap Assist will show a list of various windows that are open that you can also with ease snap into the empty spaces left. Snap Layouts was created to make multitasking more intuitive and streamlined, allowing you to easily organize your workspace and transition between applications. It's especially useful for those who routinely use many applications at the same time and wish to maximize their desktop space for increased productivity.

**To multitask with the use of Snap Layouts, follow the set of instructions below;**

- Open the applications or windows you would like to multitask with. This can be opened from the **Start Menu, taskbar, or any other preferred method of your choice.**
- If you would like to snap a window into a certain layout, select and hold **the title bar of the window** you would like to snap then move the window to one of the edges of the screen. Just as you are getting closer to the edge of the screen, you will be shown a preview of the layout the window will be snapping into.
- Let go of the mouse when the window preview is in sync with your preferred layout. The window will snap right into place in accordance with the layout you choose.
- If there is a need for you to add more windows to the multitasking layout, all you have to do is snap them into the empty spaces that are available on the screen or into any other section of the layout.

# Activity

1. Install and uninstall an application.
2. With the use of the Microsoft Store, download an application.
3. Multitask with the use of Snap Layouts.

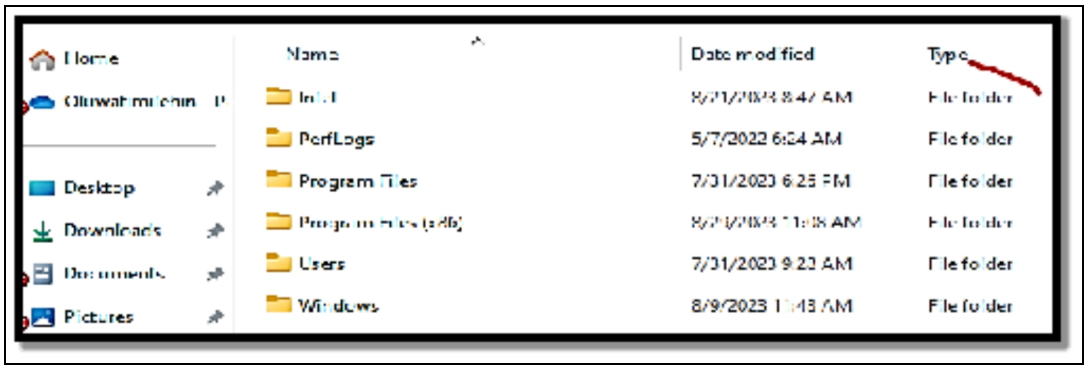
# CHAPTER 6
# FILE MANAGEMENT

The arrangement, storage, manipulation, and retrieval of digital files and data are referred to as file management on computers. Maintaining a structured and effective workflow, avoiding data loss, and making the most of available storage space all depend on effective file management. You can keep an orderly and functional digital workplace, guaranteeing simple access to your files and lowering the possibility of data loss or confusion, by using good file management practices.

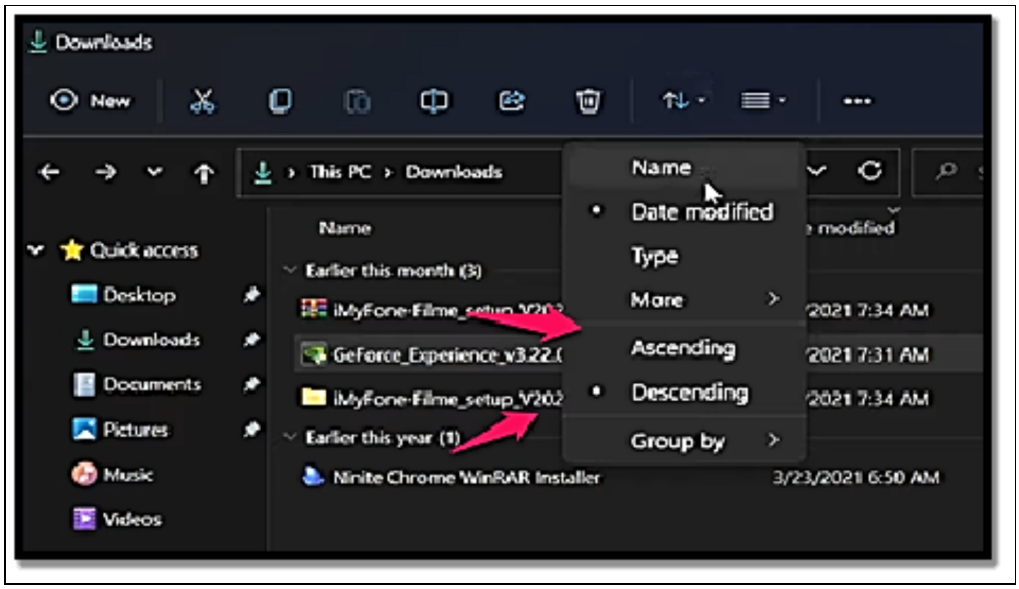
## Organizing Files and Folders

By default, File Explorer helps with the sorting of your files and folders in ascending order by name. The exception to this is for items that are in the Downloads folder; this is because they are sorted in descending order by date modified, this means that the latest downloaded file will always be at the top. In addition to having to sort files and folders, you can also have them grouped. When making use of the grouping option, File Explorer helps with the organization of all items in a folder ensuring that they are broken into various sections, depending on the criteria you pick (name, size, date, etc.) By default, items are usually not grouped in any way. **If you would like to get used to how sorting and grouping work, get the following done;**

- Start **File Explorer** and then open a folder with numerous files.
- At the top of the screen, choose or touch the **Sort icon.**
- In the Sort menu, select **Type.** Take note of just how your files will be arranged by type.




- If you would like to modify the order, choose or touch **Sort once more**, and then choose **Ascending or Descending.**




- If you would like to group items, choose or touch Sort and then choose **Group By**.
- In the Group By menu, select the grouping criteria you prefer. For instance, if there is a need for you to swiftly identify the biggest files all you have to do is choose Size. The items inside your folder will then be grouped immediately according to their size. If you choose **Size**, the largest file will be displayed in the current folder first.

## Viewing Hidden Files

File Explorer only shows files and folders that are not set as hidden by default. Your user-created files are never designated as hidden

and are always visible. The majority of apps create files, and this also occurs. However, Windows itself, device drivers, and other applications could produce files that are hidden and inaccessible while using File Explorer to navigate your PC.

**Fortunately, you can configure File Explorer so that it shows all files and directories, even those that are hidden:**

- Select or touch the **File Explorer icon** on the taskbar or you can also choose to Select or touch the **Start icon and then the File Explorer**.
- Choose or touch the **View icon** and then select **Show > Hidden Items.**

## Enabling and disabling check boxes for files and folders

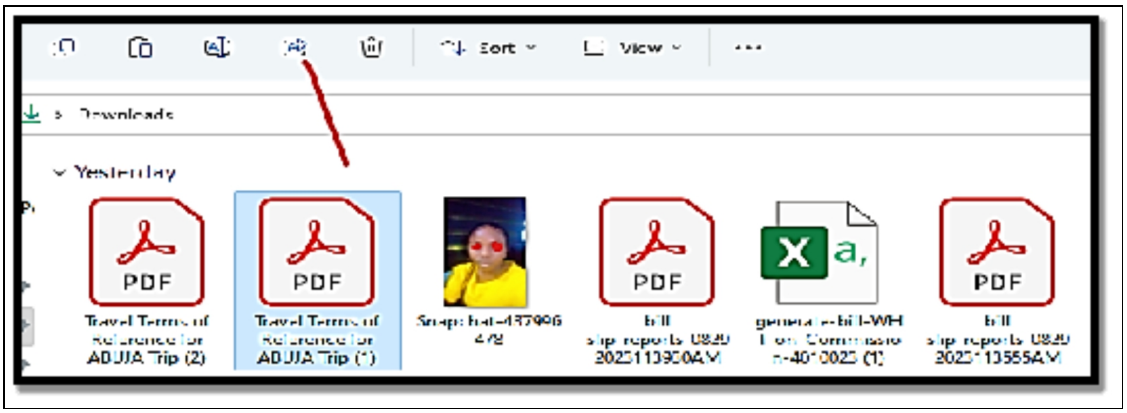
All file and folder icons in File Explorer have a check box that appears when you hover the mouse cursor (or your finger) over them or when you click or tap them if you have a Windows 11 laptop or tablet with a touchscreen. When you wish to select numerous objects and subsequently take action on them, like removing them or copying them to another location, this check box comes in handy. There may be a need for you to enable check boxes on a PC that doesn't have a touch screen option enabled; follow the steps below to get this done.

- Start **File Explorer**.
- Select or touch the View icon and then select **Show > Item Check Boxes**.

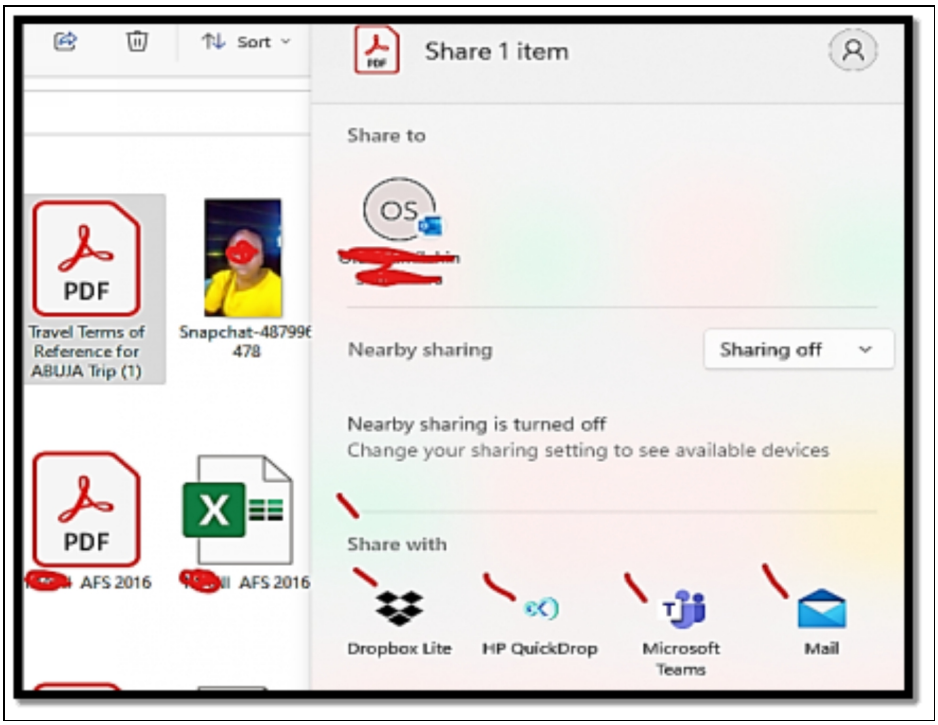
## Sharing files

Home networks and the previous method of computer-to-computer network sharing are no longer supported by Windows 11. Instead, it emphasizes the cloud and encourages sharing through other channels, like OneDrive, Mail, OneNote, and other Windows-installed programs. **Below are instructions on how to share files that you do not have presently in your OneDrive folder;**

- Start **File Explorer.**
- Navigate to the file you would like to share, which is not saved in your OneDrive folder. Choose **the file by selecting or touching the name of the file**.
- Select or touch **the share icon at the top of the File Explorer window.**



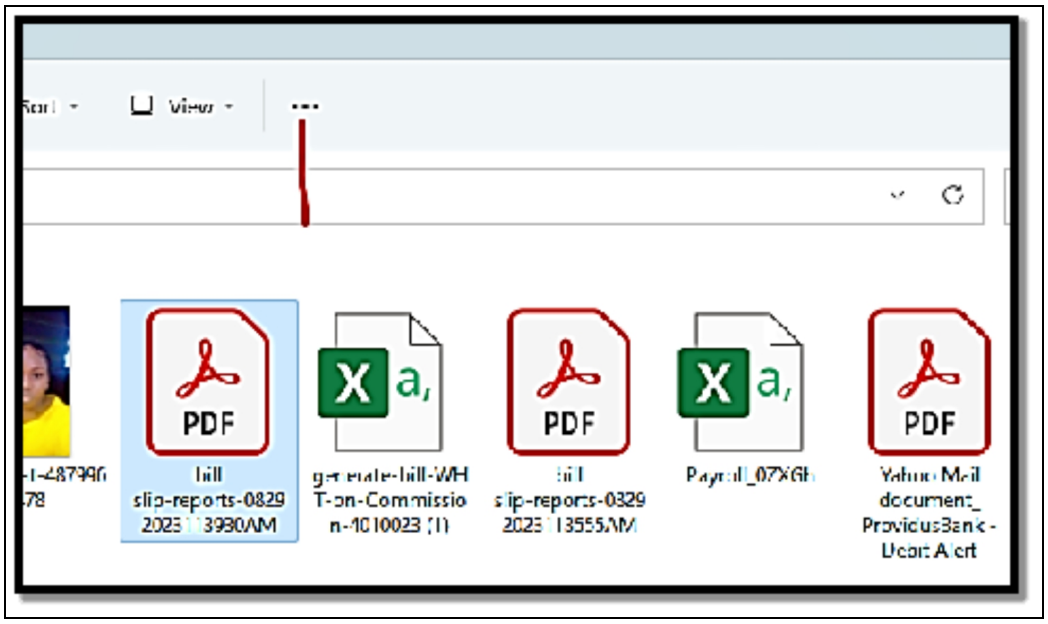

- Make **a choice of the file you would like to share**.
- Make **a choice of the mode of sharing**.




## Working with ZIP Files

An archive that includes one or more files and folders is known as a ZIP file. In the early years of the internet, when reducing the space used by a file was a big deal and resulted in many minutes saved in file transfer over slow dial-up internet connections, the idea of archiving files by combining them into one file and compressing the space used in the process was born. Since the ZIP file's specs were made available for everyone to use in order to develop apps that interact with ZIP files, it has gained a lot of support for the high-performance compression that it enables. You may open ZIP files directly in Windows 11 without the need to install a third-party program like 7-Zip or WinRAR. Other file archives like RAR or 7z cannot be opened by Windows, but they can be opened by specialist third-party programs. Since most users only utilize ZIP files to archive their data, this isn't a concern for them. **If you have a need to archive files and then send them to someone else in a ZIP file archive, take the following steps;**

- Start **File Explorer** and then move to the file or files you would like to archive.
- Choose or touch **the file you would like to archive**. If there is a need for you to archive more than just one file, choose the first file, hold down the **Ctrl key,** and then choose the o**ther files** you would like to add to your list of selections.
- At the top of the File Explorer window, choose or touch **the three dots icon.** This will open the more options button.




- In the menu, click on **Compress to ZIP file**. This will then lead to the creation of a ZIP file.

- Insert **a name for the ZIP file**, and then choose or touch **the outside of the name**.

## Using File Explorer Features

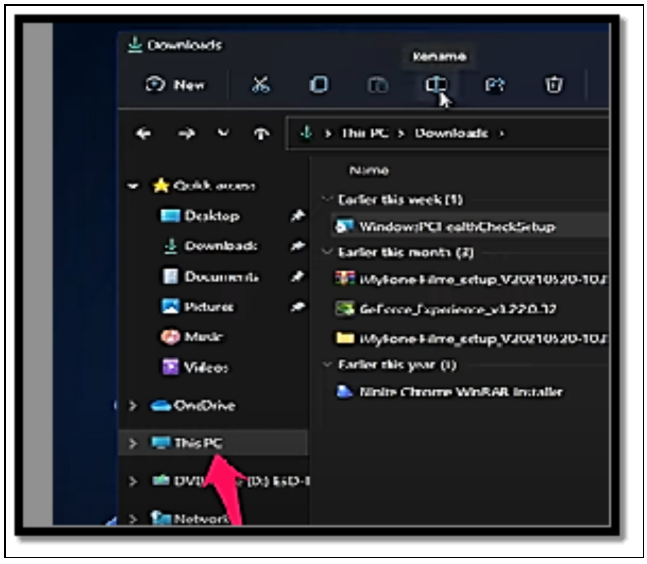
The right-click menu in sync with the use of File Explorer has gained a lot of significant redesign in Windows 11. When compared with its predecessor, Windows 10, they appear easier to use and also look very simple. Nevertheless, this also means that it may take quite some time for you to get a total hang of it. In this section, you will

learn about all the basics as regards the use of File Explorer; you will learn about navigating through it, viewing and opening, and also file and folder creation. You will also learn how to search for files, sort and group files and folders as you deem fit, and personalize the Quick Access section of the File Explorer. The File Explorer application from Windows 11 has a lot of changes as earlier highlighted. The ribbon has been removed and a lot more minimalist interfaces have been introduced, there is also a presence of icons for the most common actions which are displayed at the top.

## Navigating File Explorer

**It is quite essential for you to know how to move around in File Explorer; the set of instructions below will help you get further acquainted with the use of File Explorer.**

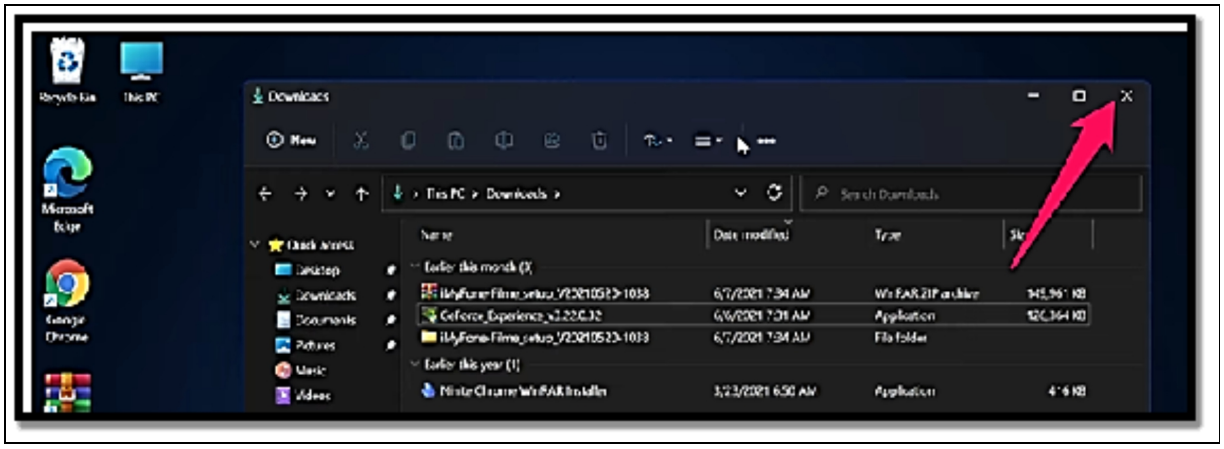
- Select or touch the **File Explorer icon** on the taskbar or you can also choose to open the Start menu and then select **File Explorer.**
- On the left side, in the column with shortcuts to various places you can navigate on your **PC, select or touch This PC**.




**Once done you will be able to see user folders such as Downloads, Music, Pictures, and Videos.**

- In the Devices and Drives section, click twice or touch twice **the C: drive**. This will open up the various folders you have in that drive.
- If you would like to return to the location you were before at any point in time during your navigation in File Explorer, select or touch the back arrow in the top-left corner of File Explorer.
- If you would like to return to where you were before in the above step, simply click or **touch the forward arrow.**

- If you would like to see just how the address bar works, select or touch This PC in the address bar, and ensure it is not the column on the left you are touching.
- Ensure you close the File Explorer, select or touch the **X in the top right corner and this will return you to the desktop.**



To easily execute commands, use File Explorer's address bar. You may, for instance, choose a folder, click or tap the address bar, type

cmd, and then press the **Enter key** on your computer. By utilizing the current folder in File Explorer, this launches Command Prompt.

## Viewing and opening your files and folders

At any point in time if you would like to open any of the places in the File Explorer which is on the left side all you have to do is click or touch the name of the folder you would like to open. Nevertheless, if you would like to open a folder or a file shown on the right side after you have clicked on the option on the left side, all you have to do again is to click twice or double-tap on **the folder or file you would like to open**. When you double-click (or double-tap) **on a file**, Windows selects the appropriate app to open that type of file. For instance, if you double-click a photo, the Photos program will appear. Depending on whatever program is configured to open PDF files, when you double-click **a PDF file**, it will either open in Microsoft Edge or Adobe Reader. Similar to this, a document will open in Microsoft Word if you double-click it, and so on.

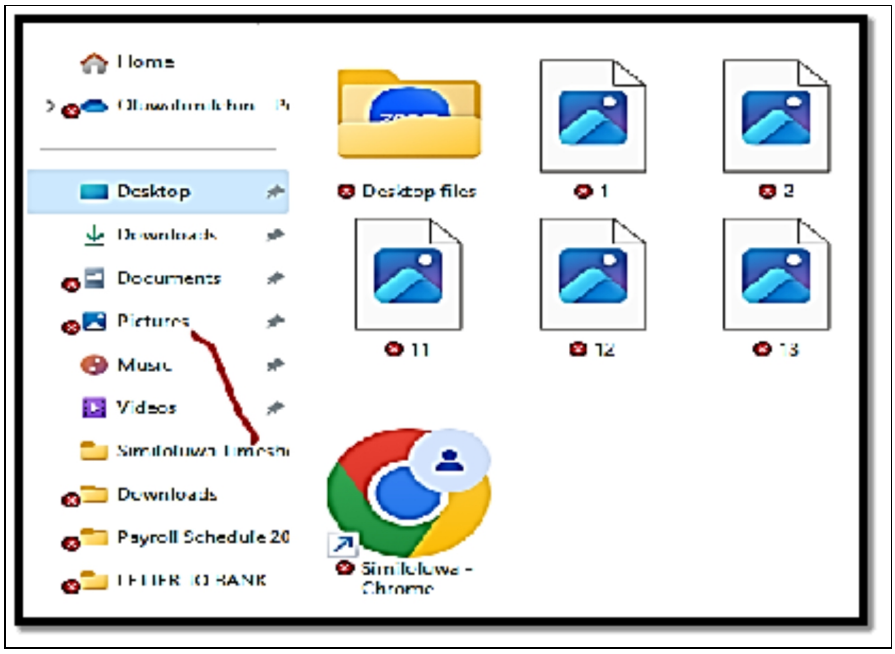
The folders can display more or less information about the files contained therein, depending on how they are configured. Depending on the contents of your folders, File Explorer displays them in various ways. For instance, File Explorer shows your **Downloads folder in the details view while showing your Pictures folder in the large icons view.**

- **Extra Large Icons**: This option provides the best previews of graphic and video files. It is widely used for pictures, media files, and also for Powerpoint presentations.
- **Large Icons:** This option is quite useful when you would like to see your pictures without necessarily having to open them. Although its thumbnails are not quite as big as the ones you often get the extra-large icons view, they are still much bigger when compared to the other views.
- **Medium Icons**: This option shows thumbnails that are big enough to provide an idea about the content of media items but they are not big enough to separate among various graphical files that are alike.

- **Small Icons**: This option shows various items in columns with no thumbnails. The icons close to your files are different based on their type.
- **List**: This option simply shows just the filenames and the icons. Your files and folders are shown as small icons which ensure it is almost hard to different from the small icons view.
- **Details**: This offers detailed information about your files and folders, split by columns.
- **Titles**: This option shows medium-sized icons for your files and folders and also for the basic details. Make use of this to show thumbnails and information about the various types and sizes of your files. While this is quite not as detailed as the content and detailed views, the layout of the tiles can be a very useful mix between the medium icons and content views.
- **Content**: Distinct rows are used to list files and directories. Details like type, size, and date edited, measurements, and authors are displayed for each item. Although its thumbnails are a little bit smaller than those utilized by the tiles view, this layout blends the tiles and detailed views.

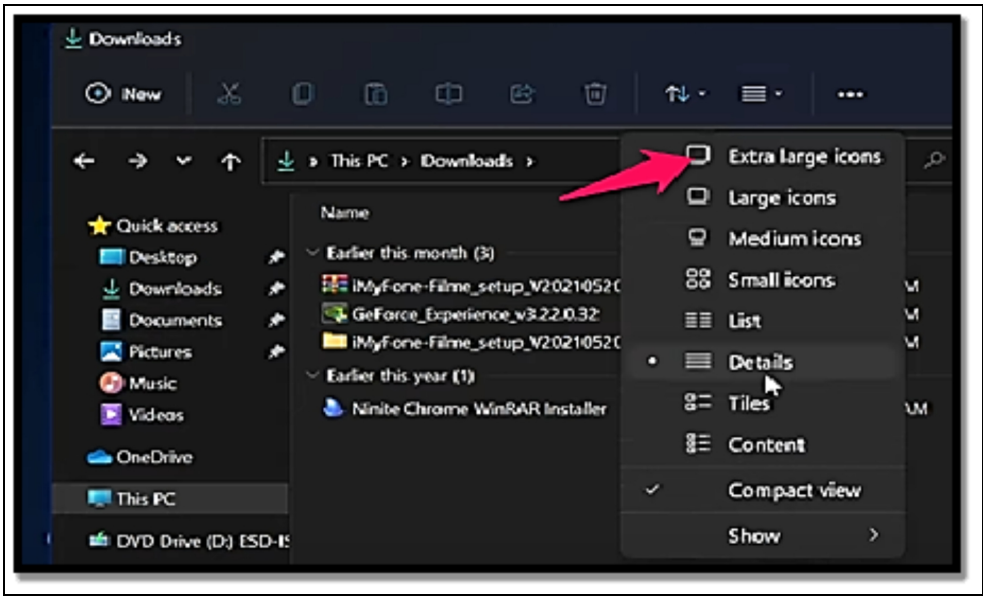
**Below are ways in which you can switch between the views that are available in File Explorer;**

- Select or touch the **File Explorer icon on the taskba**r, or you can also select or touch the **Start icon and then File Explorer**.
- Select or touch **your pictures folder on the left side of the pane**.




- All of the subfolders in your pictures folder as well as your pictures will then be displayed.

- At the top of the screen, choose or touch View. A menu will then be shown with all of the available File Explorer views.
- Choose **Extra Large Icons in the View menu**.




**It is worth noting the change in the way your pictures are shown. This view is quite very useful for previewing the**

**contents of multimedia files like pictures and videos.**

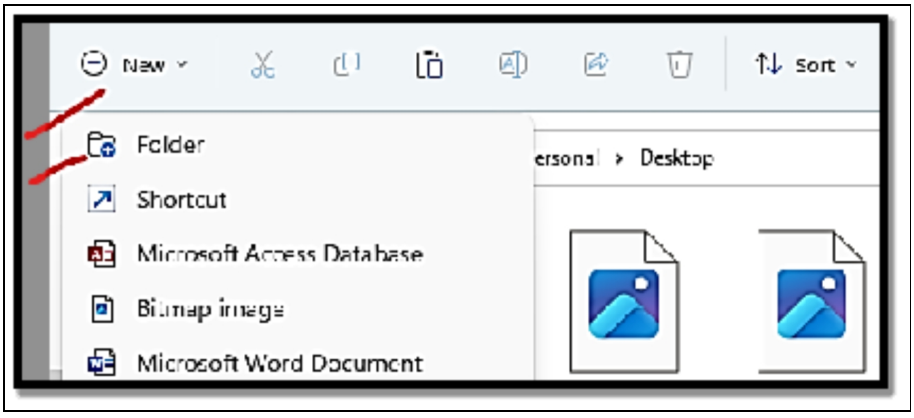
- Choose or touch **View and choose List.**
- Select or touch **View and choose Content.**
- Choose or touch **View and then choose Large Icons**.

The various views can also be changed by utilizing keyboard keys. For extra-large icons, press Ctrl+Shift+1, for giant icons, Ctrl+Shift+2, and for content view, Ctrl+Shift+8.

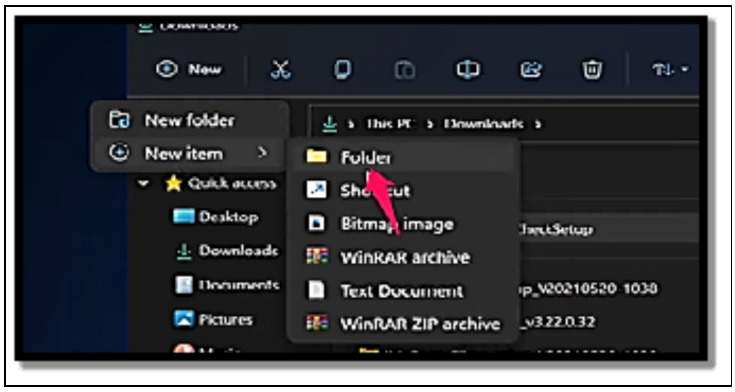
## Creating and managing files and folders

The toolbar located at the very top of File Explorer ensures it is very easy to make use of files and folders in Windows 11. The New icon options help to open a menu for creating new folders, shortcuts, and files. On the right side of the new icon, you have various icons for cutting, copying, pasting, renaming, sharing, and deleting. If you do not choose anything, these icons will not be active and might look as though they are dimmed. If you choose a file or folder with a click or touch the name of the icon, the icon will then become usable. **Below are ways you can make use of these icons;**

- Start **File Explorer** and then select or touch **the Pictures folder.**
- At the top-left corner of File Explorer, select or touch **New.**




- In the menu, select **Folder.**




- Insert the specific name you would like for the new folder and tap Enter.
- With that folder still chosen, select or touch **the rename icon at the top**.
- Insert a new name and then touch **Enter.**
- With that folder still chosen, select or touch **the delete icon at the top**.

By hitting Ctrl+Z, you can always undo a prior action (such as deleting, copying, pasting, renaming, and so forth). The same process used to create directories also creates files. The only distinction is whether you select a Text Document or a Bitmap Image in Step 3 depending on the type of file you want to create. The file is empty when it is generated, but you can add material to it by opening, modifying, and saving it.

## Searching for files

One of the most useful features of File Explorer is the search option. If there is a need for you to locate anything, make use of the search box on the top right.

**Follow the steps below to get this done with ease;**

- Start **File Explorer** and then open the drive option or the folder you would like to locate what you are searching for.
- In the top-right corner of File Explorer, select or touch **the search box.**
- Insert the full or partial name of the file or folder you are looking for, and then tap **Enter or select /touch the arrow.**

- Click twice or tap twice **on the item you would like to open.**

Only objects in the folder or location you're now in are searched for using File Explorer's search box. This strategy focuses the search and gets you results more quickly. However, it's useless if you don't know where the object you're seeking is. For instance, if a file is in your Downloads folder and you look for it in your Documents folder; you won't discover it since you searched in the wrong location. Simply access the C: drive and conduct a search there if you are unsure of where a file is located. Be aware that choosing a specific folder will save time compared to searching the full C: disk.

## Managing External Devices and Storage

On Windows 11, every storage device has a need for a volume with quite a compatible file system and drive letter in order to ensure it can be used. Basically, when you connect an internal or an external hard drive, it would have already been formatted with the basic settings needed to ensure it is plug-and-play. Nevertheless, there is always a need to manage the storage device manually. For instance, you might need to reformat a disk that was once attached to a computer or fix issues with file corruption. To make the storage more relevant for the data you will be storing, you might need to change the drive letter or label. Alternatively, you might choose to resize the volume to create separate volumes to store various file types instead of using the full drive to store data. It doesn't matter what the reason might be, Windows 11 has so many ways to manage storage devices which includes the Disks & Volumes settings as well as Disk Management. The Disk Management equipment has been in use for quite a while now and it's a console that enables you to see all drives like the SSDs, HDDs, and USB drives, and you can also make use of the available tools in the creation, resizing, formatting, and also modifying letters and labels for volumes. The new experience "Disks & volumes" is intended to take the place of the Disk Management console. It can be accessed by using the Storage settings. Similar to the legacy console, it offers an interface to examine the drives (if they haven't been started), as well as the ability to create and delete

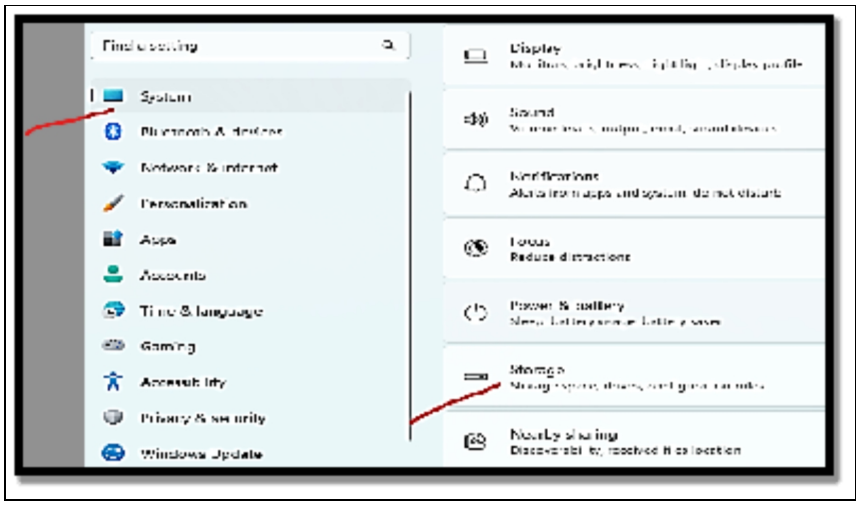
storage volumes, alter their sizes and formats, and select various letters and labels.

## Create new volume

The Disks and volume configurations ensure it becomes quite easy to format and also create a new volume on a hard drive. There is no need for you to bring it online or initialize the drive with the use of this interface. The wizard will instantly bring the storage online, initialize, and configure a default partition style.

**If you would like to create a new volume on Windows 11, follow the steps below to get this done in a simplified manner;**

- Open **Settings**.
- Choose **System**.
- Select the **Storage page on the right side of the pane**.



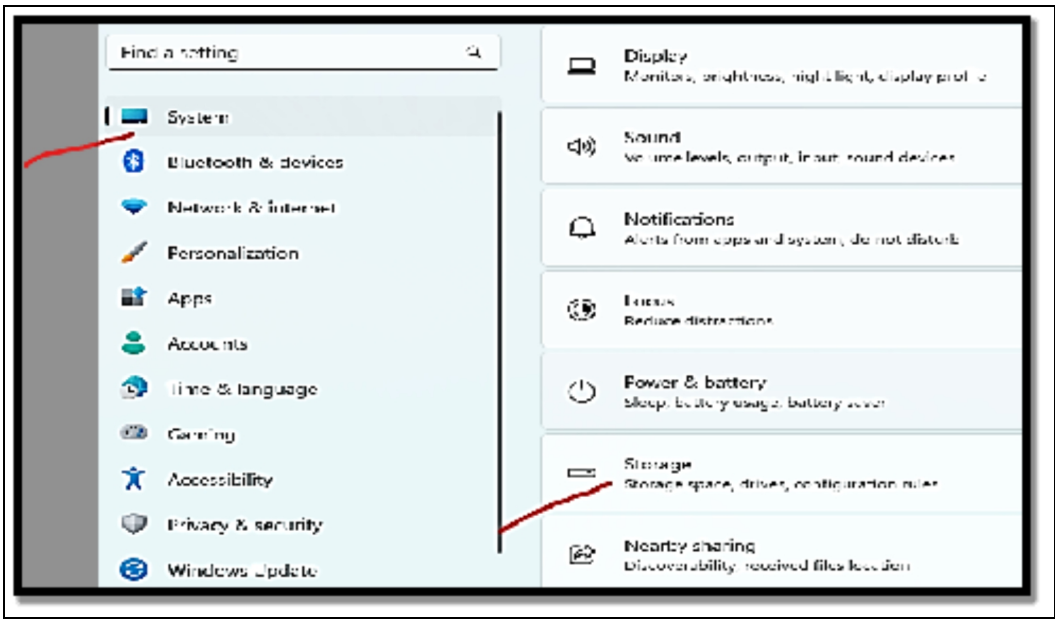

- Beneath the Storage Management section, choose **advanced storage settings**.
- Choose the **Disk & Volumes settings**.

- Choose the **drive to create a new volume option**.
- Choose the Unallocated space and then select the **Create volume button**.
- Confirm **a drive label in the Label field**.
- Choose your preferred drive letter with the Drive letter drop-down menu.
- Choose **the NTFS option with the File system drop-down menu**.
- Confirm the size of the volume if you feel there might be a need for you to create more than one volume.
- Choose the **Advanced option**.
- Run a check on the **Perform a quick format option.**
- Check the **Enable file and folder compression option**.
- Finally, click on the **Format button**.

## Change drive letter

If you would like to modify the drive letter from the Settings app on Windows 11. **Make use of the following steps;**

- Open **Settings**.
- Select **System.**
- Choose the **Storage page on the right side.**




- Beneath the **Storage Management section**, choose **advanced storage settings.**
- Choose the **Disk & Volumes settings**.

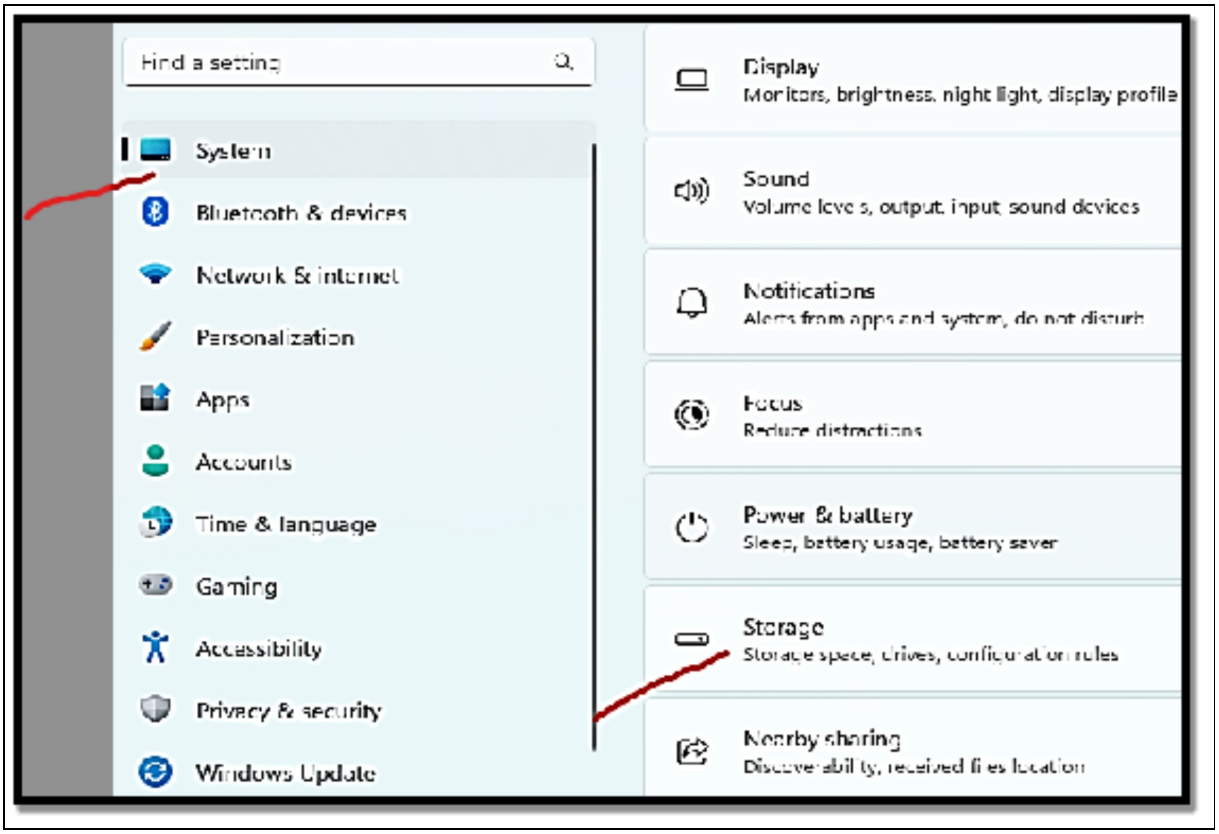
- Choose the drive to design a new volume.
- Choose the available volume and choose the **Properties button**.

- Select the **Change drive letter option.**
- Select the **new drive letter from the volume**.
- Select the **OK button.**

## Format Drive

If you would like to format a drive with a new volume and file **system with the use of the Disks & volumes settings, follow the steps below;**

- Open **Settings**.
- Choose **System**.
- Select the **Storage page on the right side of the pane.**




- Beneath the **Storage Management section**, choose **advanced storage settings.**
- Choose the **Disks & volumes settings.**

- Choose the **drive to format option.**
- Choose **the volume available and then select the Properties button.**
- Beneath the **Format section, select the Format button**.
- Confirm **a drive label in the Label field.**
- Choose the **NTFS option with the File System drop-down menu.**
- Check the **Perform a quick format option.**
- Check the **Enable file and folder compression option**.
- Lastly, choose the **Format button option.**

## Change volume size

**If you would like to change the size of a volume on Windows 11, make use of the steps below;**

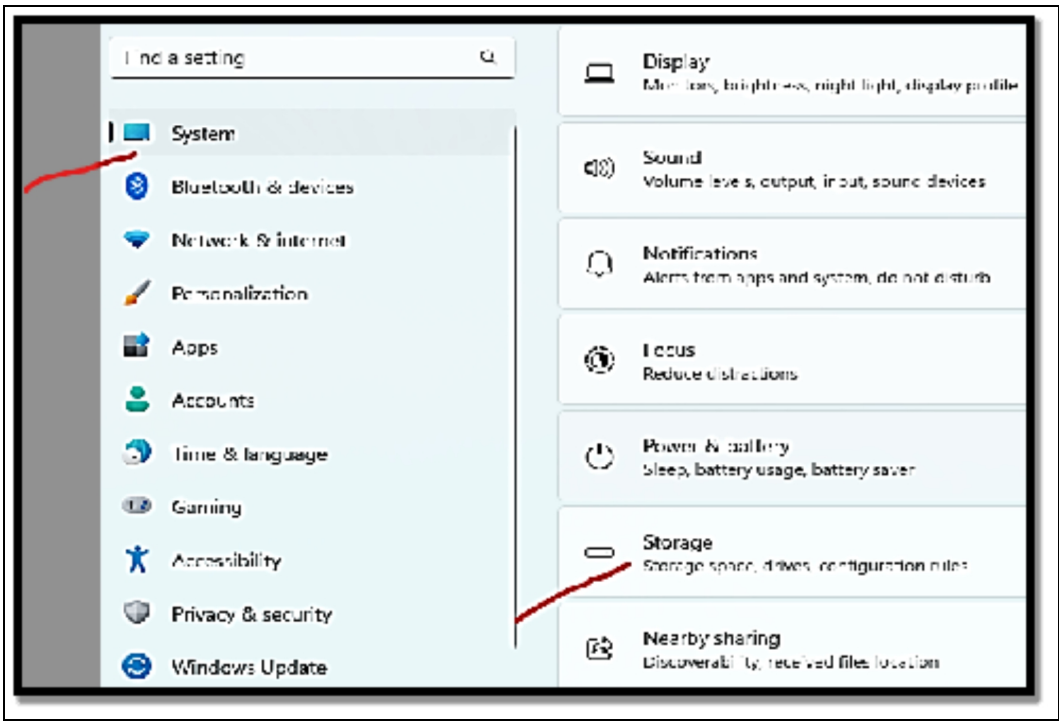
- Open **Settings**.
- Choose **System.**
- Choose the **Storage page on the right side of the pane**.
- Beneath the **Storage Management section, choose advanced storage settings.**
- Choose the **Disk & Volume configurations.**

- Choose **the drive to change the volume size on Windows 11.**
- Choose the available volume and then select the **Properties button**.
- Select the **Change Size button**.
- Indicate the new size of the space volume you would like to either reduce or make bigger.
- Select the **OK button**.

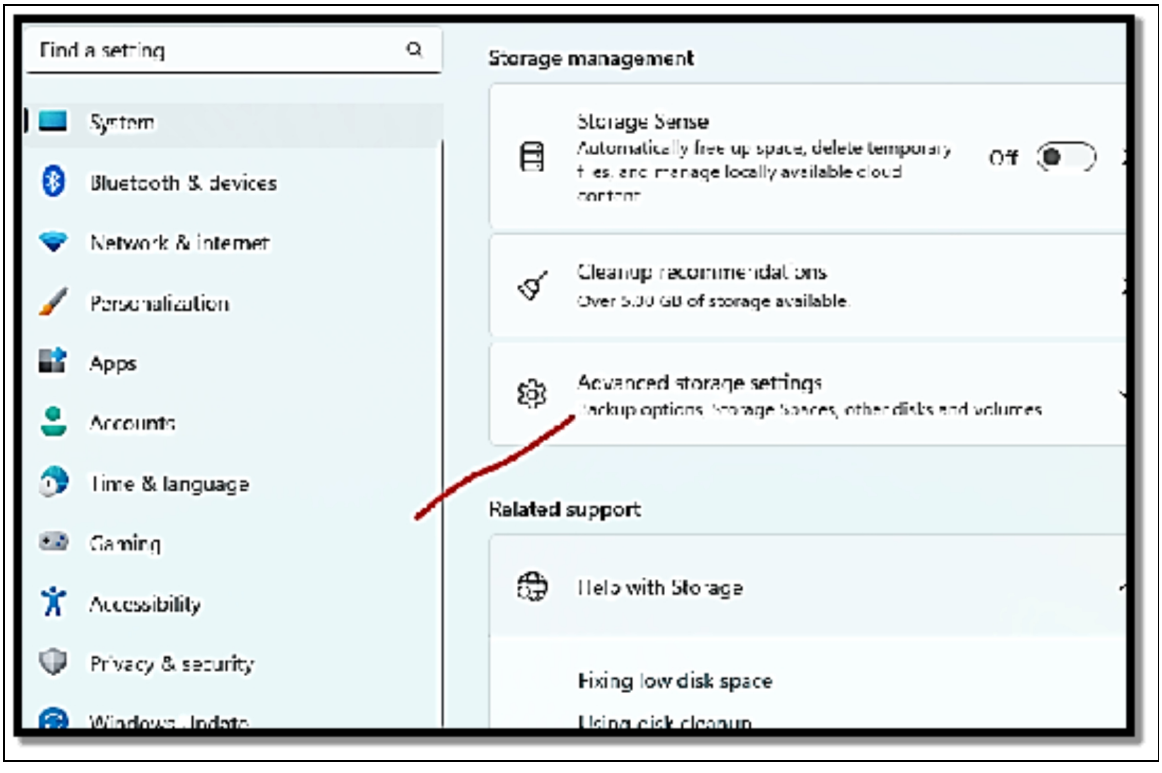
## Check drive properties

**If you would like to see the drive properties to determine the model, serial number, and some other information; make use of the steps below;**

- Open **Settings**.
- Choose **System**.
- Choose the **Storage page on the right side of the pane**.




- Beneath the **Storage Management option**, select **advanced storage settings**.




- Choose the **Disks and Volume configurations**.

- Choose the drive and select the **Properties button.**
- Confirm drive information like drive ID, manufacturer, model, serial number, media type, etc.
- Select the **Advanced Disk Properties option** in order to see the legacy information, details, and event information.

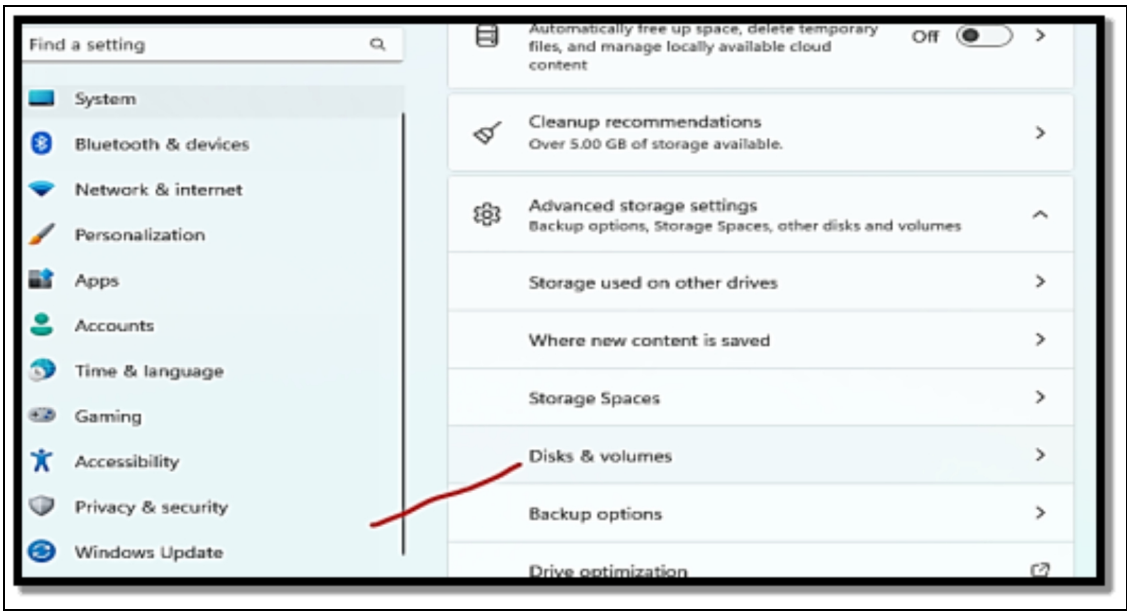
## Check drive health (SSD alone)

In order to give you enough time to make a backup of your data before it's too late; Windows 11 can also keep an eye on the health of solid-state drives (SSDs) and report any issues before a critical error occurs. However, you may always check the temperature, spare information, and predicted remaining life.

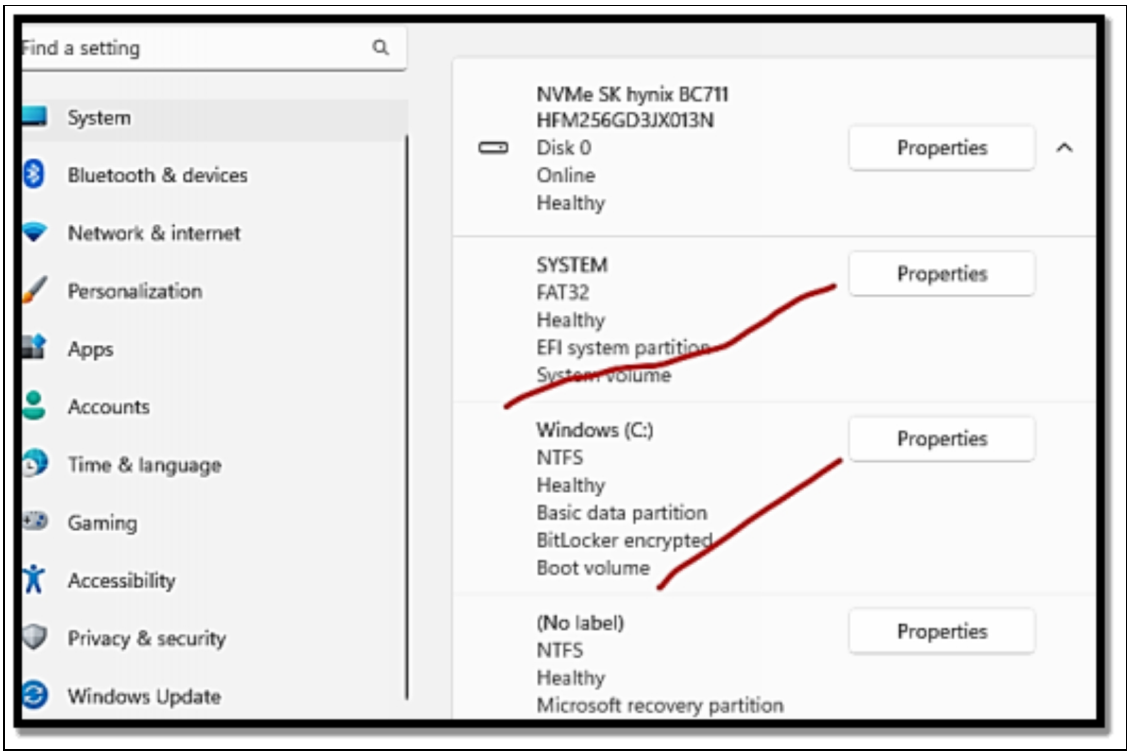
**If you would like to check the drive health on Windows 11, make use of the steps below;**

- Open **Settings**.
- Select **System**.
- Select the **Storage page on the right side of the pane**.
- Beneath the **Storage Management section, choose advanced storage settings.**

- Choose the **Disk & Volumes settings**.




- Choose the **drive and select the Properties button.**




- Make a confirmation of the drive's health which also includes the estimated left and temperature of the drive left.

## Delete the Volume on the Drive

**In order to delete a drive volume and its data on Windows 11, make use of the following steps;**

- Open **Settings**.
- Choose **System.**
- Choose **the Storage page on the right side of the pane.**
- Beneath **the Storage Management section, choose advanced storage settings**.
- Choose **Disks and Volume Configurations.**
- Choose the **available volume and choose the Properties button.**
- Choose the **Delete button.**
- Then choose the **Delete Volume button**.

# Right-clicking in Windows 11

A pop-up menu that appears when you right-click offers shortcuts for actions you might want to perform. If you're using a touchscreen, you can also access it by pushing and holding down on the item for which you want the menu by pressing once on the right mouse button. It is also known as a contextual menu since the action list varies depending on the item that you right-click (or tap and hold down on). The right-click menu has a fault in that it has been harder to use over time, especially on systems with lots of installed applications. This is due to the fact that many apps include their corresponding action shortcuts in this menu. As a result, the right-click menu is challenging to use and does not boost productivity as intended. The most frequently used functions (cut, copy, paste, and so forth) are far from the mouse pointer when you right-click. Microsoft chose to change the right-click menu in Windows 11 as a result of these problems.

As you can see, Windows 10 and Windows 8's right-click menus are less crowded than the new ones. It has an attractive new ribbon with icons right where your mouse cursor (or finger) is. The simplest and most frequent operations like cut, copy, rename, share, and delete are all found on the ribbon. Depending on the item that is right-clicked, the contextual actions listed below the ribbon change. Unlike Windows 10, which occasionally splits up or divides the tasks, this

part is consistent and continuous. Microsoft imposes stricter guidelines for programs that want to add their own actions and sections in order to maintain the right-click menu's simplicity and productivity in Windows 11. Theoretically, this ought to make right-clicking (or pressing and holding down) more advantageous than it was in earlier Windows versions.

**In Windows 11, the previous right-click menu is still present but hidden. To access it, you must take an additional step, such as this:**

- Start **File Explorer** and then right-click or **touch and hold down a file.**
- In the menu, select **Show More Options**.
- Select or **tap the option you would like to make use of from the old right-click menu**.

# Activity

1. Arrange the files and folders in your system.
2. Make use of the file explorer features.
3. Manage your external storage by creating new volumes.

# CHAPTER 7
# INTERNET AND BROWSING

Any PC or device must be connected to the Internet in order to be fully useful. How else might you view someone else's Twitter or Facebook feed? Or, to be more serious, how else would you be able to work remotely or find a new job in these epidemic times? It's not complicated to connect to the internet, as you can see in this chapter. You can either connect to Wi-Fi on your Windows 11 laptop or a network wire to your PC and your home router to get online. You then require a web browser. Edge is a good browser, despite the fact that Microsoft makes it, and they want you to use it. The only thing that Edge has in common with the infamous Internet Explorer, which afflicted the web for much too long, is the corporation that built it. Edge is a browser that I prefer over Google Chrome, and you might as well. The fundamentals of utilizing Edge are covered in this chapter. You might decide to continue with Microsoft Edge rather than try out a different browser by the conclusion of the chapter. The bad news is that Microsoft makes it difficult to switch if you do decide that you want to. One of the major complaints about Windows 11 is this and with good reason. But don't worry. You may learn how to switch from Edge to Chrome, Firefox, or Opera by reading this chapter through to the end.

## Connecting to the Internet

You must first be connected to a network that is linked to the Internet in order to use it. A wireless router in your home takes care of this for you. The network configuration at work is far more complicated and includes numerous routers, network switches, servers, and other devices. To keep things straightforward, keep in mind that you must connect to a network in order to have access to the internet. If you use a desktop PC, you most likely need to connect it to a network using a cable. Wi-Fi is the best option if you're using a laptop or tablet.

## Connecting a desktop PC to the network

If you have a desktop PC and you would like to make use of it in browsing the internet, there is a need for you to connect the PC to your home router or that of your company as the case may be. Oftentimes, desktop PCs do not have a wireless card but they often come with an Ethernet port which usually can be found at the back of the PC and can be used to connect to the network. All you have to do is plug one end of the network cable into the Ethernet port at the back of your PC and then plug the other into one of the empty ports on the back of your home or office router. Once you are done with the connection, the network icon should be displayed at the bottom right corner of the desktop. Before you establish a connection, the icon was a little globe with a sign of disconnection on it. Now that you have connected the internet cable, the sign should now look like a PC with a network cable close to it. If you move the icon of your mouse over it, you should see the text “Network Internet Access”. You are now good to start surfing the net with the use of Microsoft Edge.

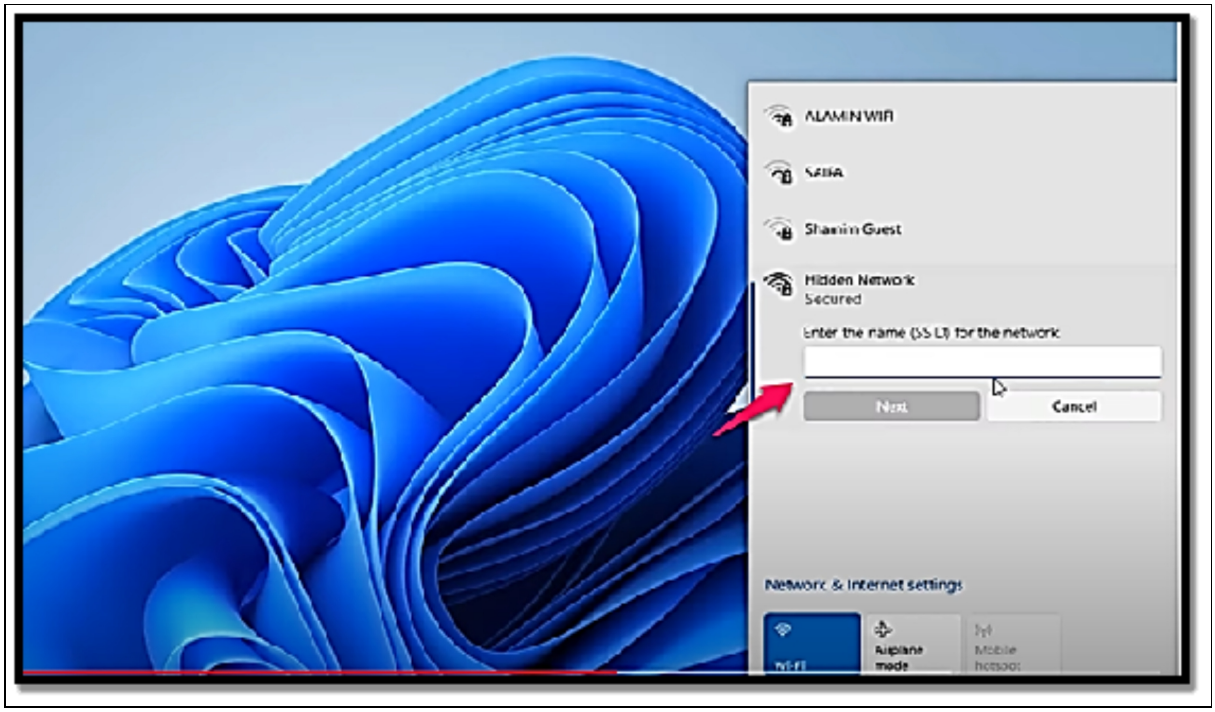
## Connecting your laptop or tablet to Wi-Fi

Before you can access the internet on a laptop or tablet running Windows 11, you must first connect it to Wi-Fi. It's not difficult to do this, but it does take a little longer than it did with Windows 10.

**This is how it goes:**

- Select or touch the **globe icon** which can be found at the bottom right corner of the desktop or you can also choose to tap **Windows + A on the keyboard**.
- If the Wi-Fi icon in the Quick Settings panel is dimmed, all you have to do is select or touch it so as to activate the Wi-Fi chip on either your laptop or your tablet.
- Select or touch **the right arrow close to the Wi-Fi icon**.
- Locate **the network** you would like to connect to and then choose or touch **its name.**

- Choose the box close to **Connect Automatically and then select Connect**.
- Insert the password of your Wi-Fi network and then choose **Next**.




- Choose or touch a**ny empty space** on your desktop in order to close the Quick **Settings panel, and that will be just all!**

## Connecting to Hidden Wi-Fi

Certain people always like to have their Wi-Fi hidden. These networks are usually not always truly hidden because you can still detect them with the use of the right tools, and hackers know just how to locate them with so much ease. Nevertheless, a hidden Wi-Fi does not usually show its name, and most people and devices usually also do not see it hence they do not bother to connect.

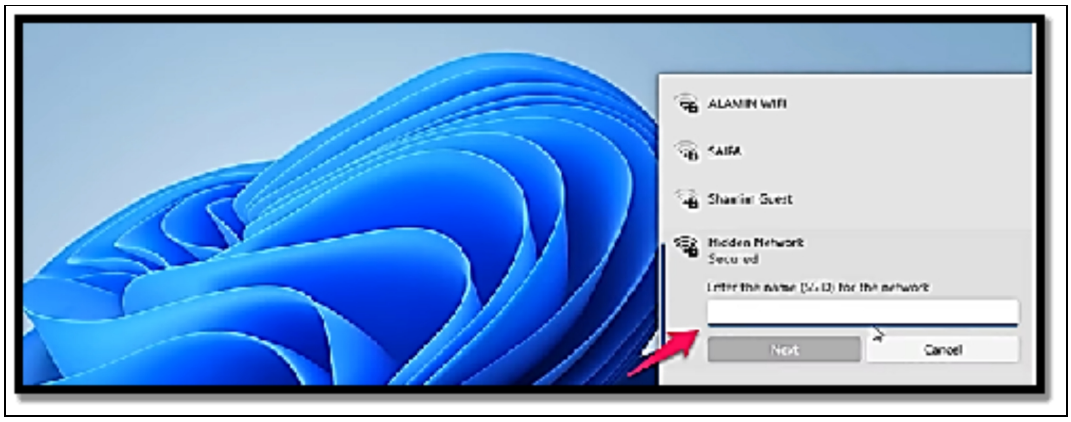
**If there is any hidden password you would like to connect to, there is a need for you to have the knowledge of the following details before you make an attempt to connect;**

- The exact name of the network is often case-sensitive.
- The Wi-Fi connection password.

**Once you have gotten the details above, follow the set of instructions below to connect to the network;**

- Choose or touch **the globe icon in the bottom-right corner** of the desktop or tap the **Windows + A buttons on your keyboard.**
- If the Wi-Fi icon in the **Quick Settings panel** looks dimmed, choose or touch **it in order to get the Wi-Fi chip activated on either your laptop or your tablet**.
- Choose or touch **the right arrow close to the Wi-Fi icon**.
- Navigate to the end of the list, and then choose **Hidden Network**.
- Choose the box close to **Connect Automatically and then choose or touch Connect.**

- Insert the name of the hidden network and then select or touch **Next.**
- Insert the password for connecting to the hidden Wi-Fi and then choose or touch **Next.**




- Choose or touch **just anywhere on an empty space** on your desktop so as to close the Quick Settings panel.

## Using Microsoft Edge Browser

Both the outdated Microsoft Edge browser and the original Internet Explorer are included in Windows 10. Microsoft created Edge's earliest versions with a proprietary rendering engine that was distinct from Firefox and Chrome and had a special set of features. Sadly, it didn't increase its market share much, so Microsoft changed its approach to If you can't beat them, join them! As a result, Microsoft has abandoned its unique rendering engine as of 2019 in favor of Chromium, an open-source engine also utilized by Google Chrome and Opera. Only Microsoft Edge is included in Windows 11, and it is a vast improvement over earlier Windows 10 versions. Additionally, as Chromium's code develops and gets better (in part thanks to Google and Opera), so does Microsoft Edge, and vice versa. I'm not sure what else will result in a simpler web if it doesn't. Additionally, Microsoft Edge supports Chrome extensions, allowing you to add any function you desire, exactly like Google Chrome.

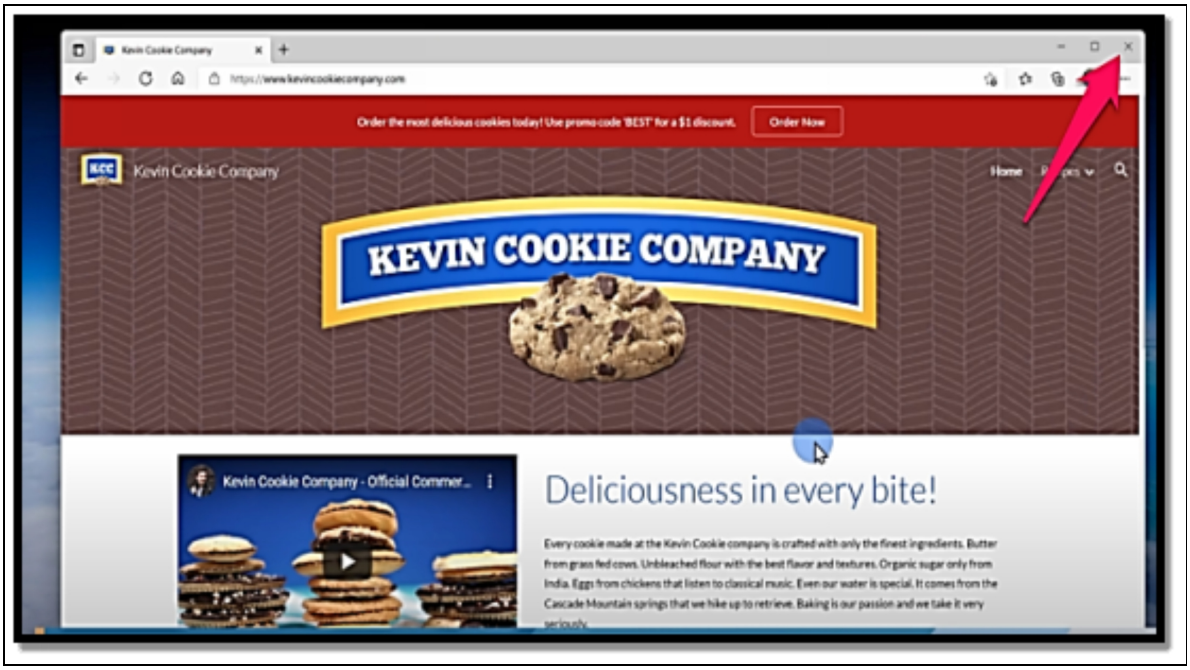
## Getting Familiar with Microsoft Edge

Microsoft Edge works just fine like any other web browser and its user inference ought to be familiar if you are a regular user of the internet especially if you have been using Google Chrome.

**Follow the set of instructions below to learn more about its user interface;**

- Choose or touch the **Microsoft Edge icon on the taskbar** or you can also choose to do that from the **Start menu**.
- In the address bar at the top of the screen, insert **a website you would like to visit**.

- Choose **or touch the gear icon (page settings) close to the top right.**
- Alternate between different page layouts available and make your preferred choice.
- In the address bar, insert your preferred website again, for instance, facebook.com, and then tap the **Enter button on your keyboard**.
- Choose or touch **the three dots icon at the top-right corner of Microsoft Edge**.
- If you would like to close Microsoft Edge, choose or touch **the X icon in the top-right corner.**




# Enabling vertical tabs in Microsoft Edge

The tabs in Microsoft Edge are often shown horizontally on the top side of the window. On the left side of the browser, you can also use vertical tabs, though.

**Do this to enable vertical tabs:**

- Select or touch **the Microsoft Edge icon on the taskbar** or you can also choose to do that from the Start menu.
- Right-click or tap and hold down **on the new tab**.

- In the menu, choose **Turn on Vertical Tabs**.

Repeat the process, but choose Turn off Vertical Tabs in Step 3 if you want the horizontal tabs back. Alternatively, you can use the keyboard shortcut Ctrl+Shift+, (comma).

## InPrivate browsing with Microsoft Edge

Microsoft refers to Edge's private browsing mode as InPrivate. Compared to regular web browsing, it offers a little more private method of browsing the internet. **Microsoft Edge performs the following actions once you use InPrivate to browse the web and dismiss all windows and tabs for private browsing:**

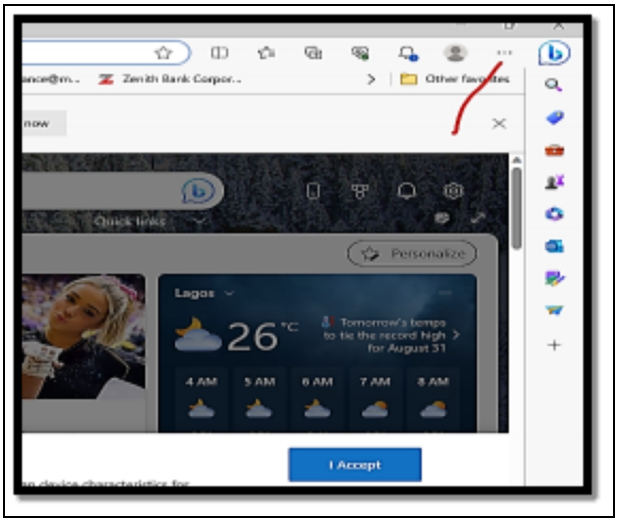
- Removes all cookies that were saved while InPrivate browsing. When you check into a website, such as Facebook, Gmail, YouTube, or another one, and then shut all private browsing windows and tabs, all the cookies created by the websites you visited are destroyed, and you are immediately signed out. Imagine that someone else tries to open a new browser tab and view the same websites. If so, they aren't immediately logged in using your account(s) in that scenario. Cookies from typical browsing sessions are kept intact.
- Removes all of its records of all the data you have typed in forms, like sign-up pages, login pages, and contact pages.
- Removes temporary files and the cache from your browsing session. Anytime you go to a website, files like images and style files will be downloaded to your device. These files are saved on your computer for your private browsing session duration so that browsing will become quite faster. When you have closed all private browsing tabs and windows, all of these files will also be deleted hence no one will be able to gain access to them.
- Removes browsing history from your browsing session. Once this is done, other people with access to the computer will not know the sites you have visited on the web by simply looking at your web browser.
- Does not keep track of the searches you've made while browsing. You may perform an online search directly from the address bar of any web browser. When you enter a few terms

and hit Enter, the default search engine receives the keywords and starts returning results. This information is saved during routine browsing sessions so that it can be reused later and speed up your web browsing. This information is not saved during private surfing, preventing others from using it when logging onto the same computer or device.

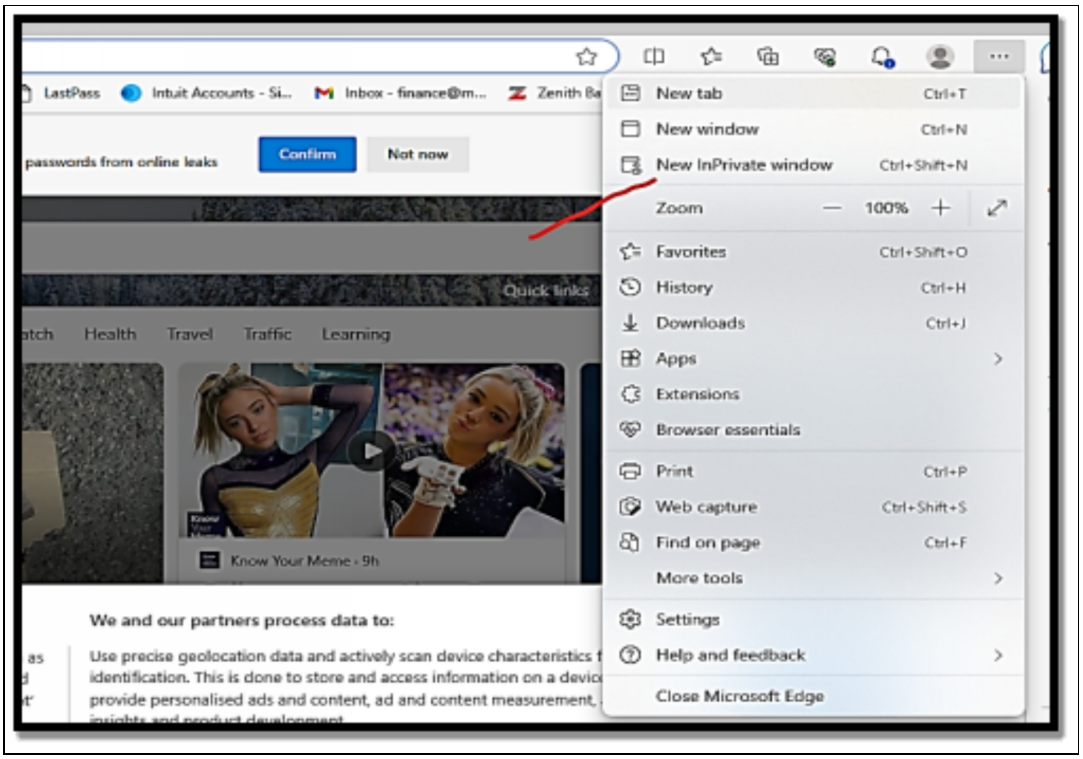
Due to the fact that other users of the same computer are unaware of your online activities, all these features improve your privacy and secrecy. Private browsing does not, however, guarantee that no one may follow you. If you're at work, your network administrator and internet service provider are both still aware of what you did online. Use a VPN that has a rigorous no-logs policy if you wish to remain anonymous.

**If there is ever a need for you to browse privately with the use of Microsoft Edge, get the following done;**

- Choose or touch **the Microsoft Edge icon** on the taskbar or from the Start menu.
- Choose or touch **the three dots icon in the top right corner.**




- In the menu, click the **New InPrivate window**.



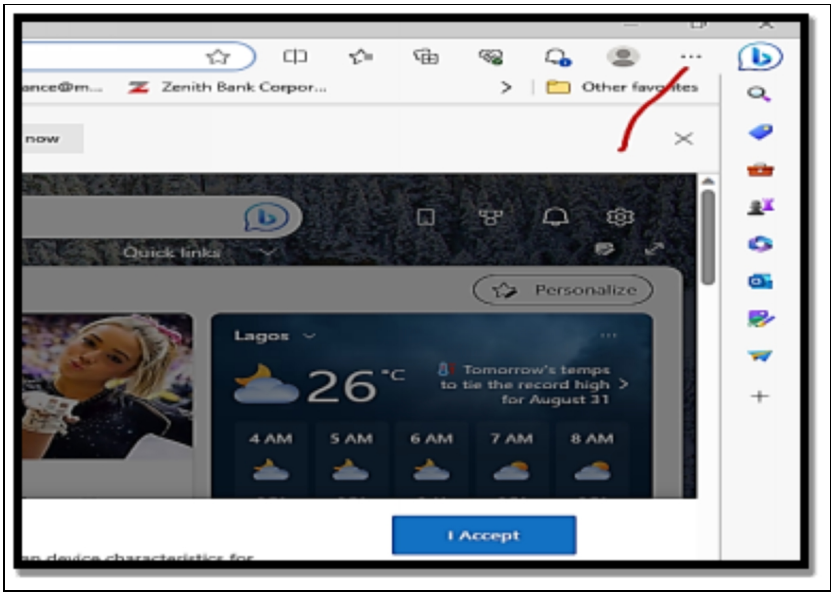

When using InPrivate browsing, turn the setting for Always Use "Strict" Tracking Prevention on if you want the most stringent level of tracking prevention. Every tab you open while browsing in Microsoft Edge's InPrivate window employs the same private browsing mode. Only when the entire InPrivate browsing window and all of its tabs are closed will the private browsing session come to an end. Using the keyboard shortcut Ctrl+Shift+N, you can start a fresh InPrivate browsing window. Few people are aware that you can simultaneously utilize regular and InPrivate browsing windows. The cookies that are stored by one window do not impact the other because they are separate.

## Add extensions to Microsoft Edge

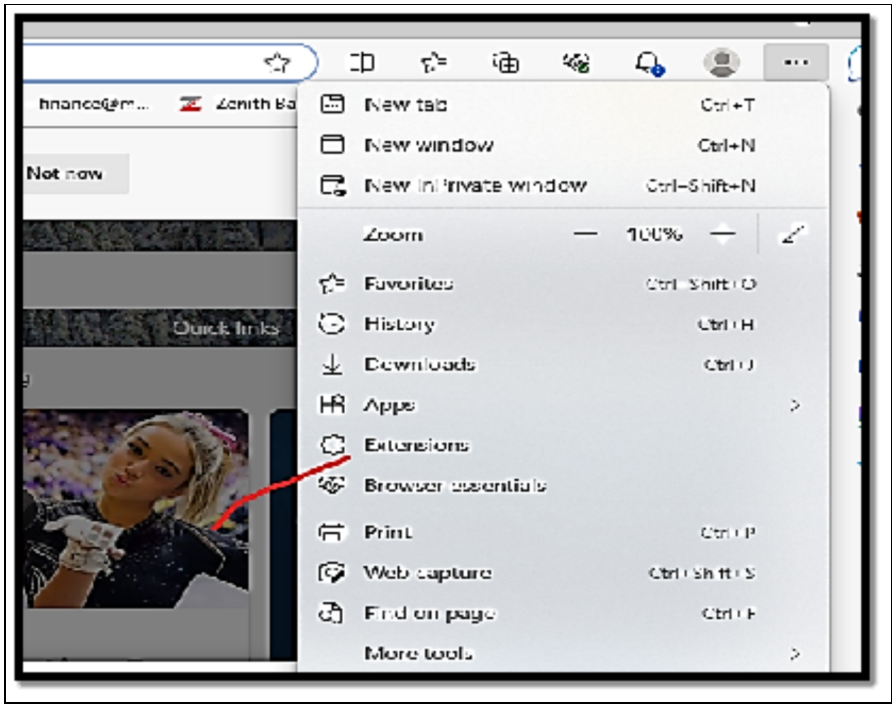
By including the extensions and add-ons that interest you, Microsoft Edge may be made to suit your needs. They are an excellent method to change the way you browse and increase your overall efficiency. For instance, you can utilize Microsoft Edge extensions to include an ad blocker, a Facebook video downloader, and a password manager like Bitwarden.

**Follow the steps below to include an extension in Microsoft Edge;**

- Start **Microsoft Edge**.
- Choose or touch **the three dots icon in the top-right corner.**




- In the menu, select **Extensions, and then choose or touch Manage Extensions.**



- Choose or touch the **Get Extensions for Microsoft Edge button.**
- Choose or touch an extension you would like to add for example; AdBlock.
- Choose or touch the **Get button and then Add Extension.**

## Using Other Web Browsers

There are fewer differences than ever between what web browsers all do. Because Microsoft Edge now uses the same rendering engine as Google Chrome and Opera and supports the same Chrome extensions, you could stick with it and never miss a thing.

**Below are things worth considering as regards Microsoft Edge and other web browsers;**

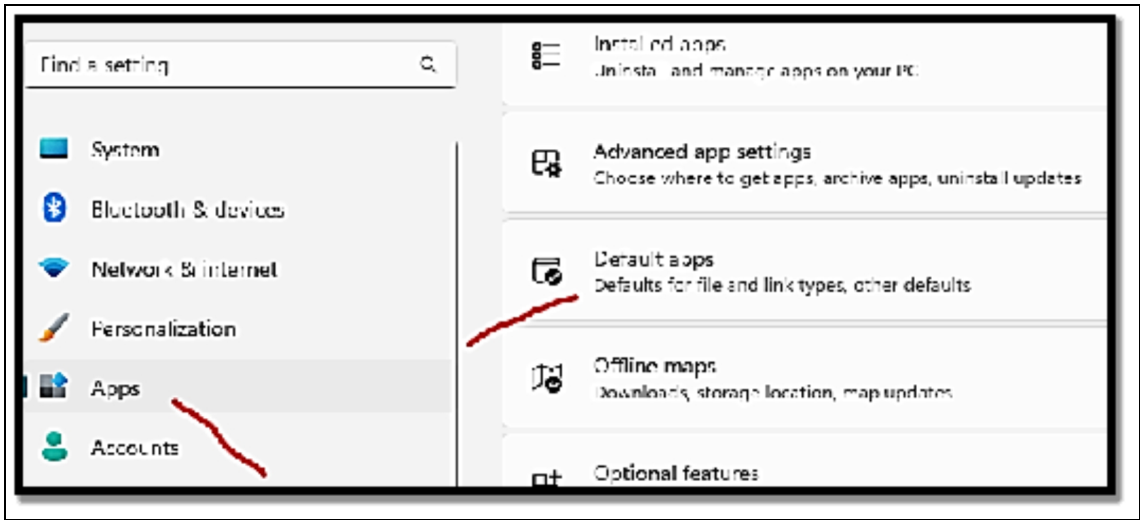
- A great browser to use is Microsoft Edge, which has a ton of unique features like vertical tabs, tight private browsing, and shopping assistants. It changes quickly, and when this book is released, it will have some new features that I hadn't tried out when writing it. You should give it a try before switching to a different browser, in my opinion.
- Due to its seamless integration with Google services like Gmail, Google Docs, Google Drive, and more, Google Chrome is the online browser to beat. It makes sense to utilize Chrome on all of your computers and mobile devices while keeping it synced with your Gmail account if you use Android.
- Another excellent browser previously used by most users before switching to the new Microsoft Edge is Opera. It has several great integrations with WhatsApp, Facebook, Twitter, and other services, and it has the same rendering engine as Edge and Chrome. Opera is a wise choice if you wish to talk or engage in social media interaction while conducting productive web browsing as usual. It is compatible with Chrome extensions.
- For many years, Mozilla Firefox was the most popular web browser, but recently it started to lose users and media attention. Except for Linux, it is not promoted by any significant platform or supported by any large organization. Additionally,

because fewer websites will support it in the future, it uses its own rendering engine, which could be troublesome. Although Firefox is still a fantastic browser, I predict that it will eventually lose market share to Microsoft Edge and Google Chrome and become a niche product like Opera.

## Changing the default browser

In Windows 11, Microsoft Edge appears as though it has been forced on users because it is quite difficult to change it from being the default web browser. If there is a need for you to switch your **default browser from Microsoft Edge to Google Chrome or any other web browser of your choice, follow the steps below;**

- Choose or touch the **Start icon and then Settings or you can also choose to press Windows + I on your keyboard.**
- On the left side of the **Settings App, click on Apps**. On the right, choose or touch **Default Apps**.




- Navigate down the list of Apps on the right until you are able to locate **Google Chrome or your preferred replacement**. Select or **touch the name.**
- Beneath **.htm, select or touch Microsoft Edge, Switch Anyway, Google Chrome, and then OK.**
- Under .html, select or touch **Microsoft Edge, Google Chrome, and then OK**.

- Take the 5 steps again for all entries where you see Microsoft Edge as the default as against Google Chrome or any other suitable browser of your choice.

## Managing Bookmarks and Tabs

Like in earlier iterations of Windows, web browsers in Windows 11 let you manage bookmarks and tabs to keep your surfing experience organized.

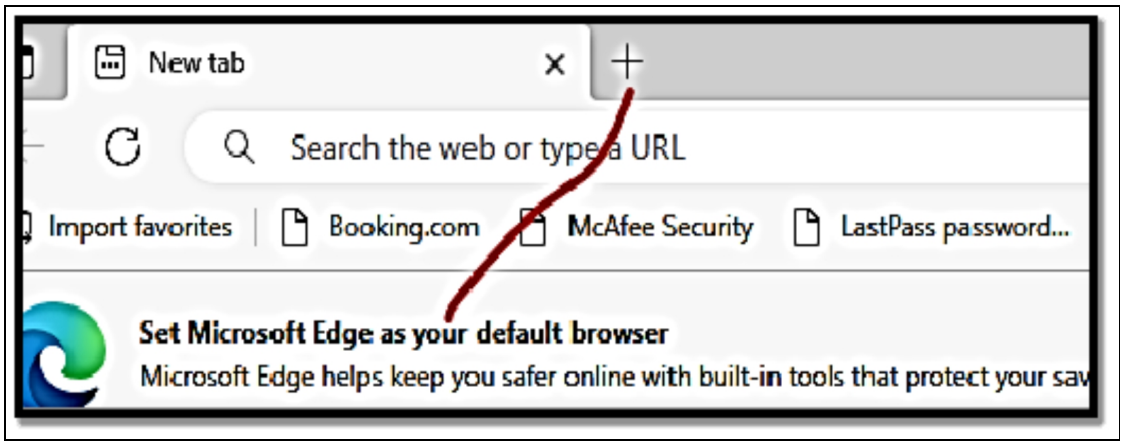
**How to handle bookmarks and tabs in Windows 11 is as follows:**

## Bookmarks

- **Adding Bookmarks**: If you would like to add a bookmark to a webpage that you are on at the moment, click on the **start icon in the browser's address bar**. You also should be able to make use of the keyboard shortcut; Ctrl +D.
- **Organizing Bookmarks**: Oftentimes, most browsers enable you to design bookmark folders in order to categorize and organize your bookmarks. When you right-click on a bookmark or folder it often provides you with various options to create new folders, rename items, and lots more.
- **Accessing Bookmarks**: Most times, you can gain access to bookmarks from the menu of the browser or with the use of the toolbar.
- **Editing and Deleting Bookmarks**: Typically, you can right-click **on a bookmark to either edit its name or URL or completely delete it.**

## Managing Tabs

- **Opening New Tabs**: In Windows 11, you are able to open a new tab by simply clicking or touching **the + button close to the last tab opened**. You are also able to make use of the keyboard shortcut **CTRL +T**




- **Switching Tabs**: Select **a tab** you would like to switch to. You can also make use of keyboard shortcuts like **Ctrl + Tab for cycling through tabs.**
- **Closing Tabs**: If you would like to close a tab, select **a small X button** for the tab you would like to close.

- **Tab Groups:** Certain browsers enable tab grouping; this enables you to arrange tabs that are related into different groups. This can be of great help in ensuring you manage various tabs opened in a timely and efficient manner.

## Activity

1. Make use of the Microsoft Edge browser to browse the internet.
2. Search the web for various information.
3. Create and manage bookmarks effectively.

# CHAPTER 8
# COMMUNICATION AND COLLABORATION

Collaboration and communication are critical components of human connection and are essential in a variety of settings, including social, professional, and personal ones. People can communicate knowledge, concepts, opinions, and experiences with one another through communication. It serves as the basis for the dissemination of information and insights. Relationship development and maintenance depend on effective communication. In both intimate and professional settings, it promotes communication, empathy, and connection between individuals. Problem-solving and conflict resolution depend heavily on effective communication. People can cooperate to discover answers and come to agreements when they openly share problems and concerns.

People get together through collaboration to work towards a common objective. It blends individual skills and strengths to provide more complete and creative solutions. Diverse perspectives are brought to the table by working with people who have different backgrounds, experiences, and areas of expertise. This variety may promote more original problem-solving and well-rounded judgment. People have the chance to learn from one another in collaborative contexts. Growing personally and professionally is facilitated through knowledge and skill exchange. The effective use of resources is frequently the result of collaborative efforts. Organizations and teams can accomplish more than they could on their own by combining their resources. Technology has completely changed how we interact and communicate in the modern digital era. Collaboration across geographical borders has never been simpler thanks to tools like email, instant messaging, video conferencing, project management software, and collaborative platforms. Effective communication and teamwork are crucial for realizing your goals and enhancing your experiences, whether you're working on a project, preserving personal bonds, or advancing society.

## Setting Up Email and Calendar

Since the release of Windows 7, the state of the Mail, Calendar, and People productivity apps has undergone significant changes. Mail, Calendar, and People were essentially simply one tool in the good old

days, much like Outlook is now in Office, which handles all the bases. Despite handling mail, contacts, and calendars, that one application was confusingly referred to as Windows Live Mail. It had a limited feature set, was outdated, and operated relatively well. Microsoft developed three distinct programs for Windows 8: Mail, Calendar, and People. Though connected, each of the three operated separately. With Windows 10, and to a lesser extent with Windows 11, things got better. There are now two apps: People and Mail, which function as one app with two working modes. You will discover how to use the Mail and Calendar in this chapter.

**There are three divisions of email and in the sections below; you will learn more about them;**

## Email programs

These are often referred to as email clients, email readers, or mail user agents. They help with reaching out to your email, which is saved somewhere on a server (in the cloud which can be said to be the email company of your computer), download it to your machine, and then help you work on it there instantly. Messages will be saved on your PC and, optionally, taken off the server anytime you make an attempt to get them retrieved. Whenever you write a message, it will also get saved on your machine but also it gets sent out through your email company. Your clients will then interact with your email company. Your email client will also interact with your email company's server via strictly defined processes known as protocols. The most common protocols are POP3 and IMAP. As is often the case with almost all computer acronyms, the names do not really hold any meaning, although the protocols are somewhat different.

## Online email

The most popular email services, Gmail, Outlook.com, or Yahoo! Mail, among many others, are accessed using web browser or computer software that functions similarly to a web browser. Mail is kept on the servers of your email provider, but you can see it on your computer. Anyway, to a first approximation. From any web browser, wherever in the world, you may access your mail service and resume where you left off.

## Hybrid systems

As the name implies, this helps to combine local mail storage on your machine with online email. In the same way, email clients are accruing

more online email characteristics so are online email systems also making use of limited local storage. For instance, Gmail, the typical online email program can be configured to save email on your machine so you will be able to work on email while you are away from an internet connection. The Windows 11 Mail app is a hybrid system that can be configured with any company's email computers. As email takes over mobile devices, all strategies are expanding. Microsoft currently offers Outlook versions for Windows 11 (in conjunction with Office 2021 or Microsoft 365), iPad, Android, and online via any type of device's web browser. The browser, Android, and iPad apps are free for personal use, but Microsoft 365 subscriptions are necessary for corporate use and to access particular features. Microsoft has put a lot of effort into making each variant resemble the others in appearance and behavior. Google has Gmail apps for Android, iPhone, and iPad, too, however, access to Gmail on Windows requires a browser. In contrast to Outlook, Gmail has consistently provided the same user experience and behavior across all of its various platforms. Although the organizational and free versions of Gmail are identical, organizations must join up for (and pay for) Google Workspace.

Perhaps surprisingly, Outlook and Gmail both function nicely with virtually any email account thanks to POP3 and IMAP. Both @gmail.com and @outlook.com (as well as @hotmail.com, @msn.com, @live.com, and so forth) email addresses are compatible with Gmail.

## Comparing email apps

There are so many benefits with the use of Windows 11 Mail but this may not totally suit your needs. The most important question you need to ask yourself is if Windows 11 is the right one for you or not. To make the situation rather complicated, Mail is not an either/or choice; for instance, you can configure Outlook.com or Gmail accounts and then get to use it with those accounts that are making use of either Mail or a web-based interface. As a matter of fact, you can move to and fro between working online in your web browser of choice and working on your Windows 11 computer. Mail in Windows 11 serves as a focal point: For instance, it receives mail from Outlook.com and sends mail using Outlook.com. The same is true for Yahoo!, Gmail, and other email providers. But when everything is functioning properly, the Mail app doesn't remove the mail: In Outlook.com or Gmail, all of your emails are still there waiting for you. In most circumstances, you won't miss a thing if you use Mail in the morning, switch to Gmail or Outlook.com when you arrive at work, and then return to

the Mail app when you get home. The fact that Windows 11 Mail retains some of your most recent communications on your computer is the key advantage over Outlook.com or Gmail. (Google Mail running in Google Chrome can accomplish the same thing, but you must configure it.) You can't download new messages or send replies if you can't access the internet, but at least Mail lets you view your most recent communications.

## Comparing calendar apps

Calendars can also be taken care of by a bewildering array of packages and sites. Among the numerous competing calendar applications, each of them has quite a unique twist.

## Google Calendar

This is highly known for being very powerful and also quite easy to navigate. It is also considered to be well integrated with other applications made by Google; although you can make use of it and also share calendars with other people without having to put your foot in another Google application. You can set all of your appointments in Google Calendar and you will gain immediate access to your latest calendar from any computer, tablet, or smartphone that can access the internet.

## Outlook.com Calendar

This is also reasonably powerful and well-integrated; you can also share the calendar with your contacts or any other person. The Outlook Calendar is the best option if you wish to plan one conference room in a workplace with 100 employees who all use Outlook. Any of the calendar applications will do if you want to keep track of your flight times, Aunt Martha's birthday, and the kids' football games.

## Outlook

This also does calendars and has so many options that you may have a feeling that intimidates you. If there is a need for you to schedule one conference room in an office with lots of people, all of those who make use of Outlook, the Outlook Calendar is the right place to go. If you would like to keep track of your flight departure times so that you don't get to miss your flight, the birthday of someone special to you, and also football games of your favorite clubs; just any of the calendar apps will work just fine.

## Using the Mail app

The first time you select or touch the Mail shortcut from the Start menu, you will be allowed to add an account of your choice. If you signed into Windows 11 with the use of a Microsoft account, you just have to click or touch for some time and then you will be taken to the Mail screen.

| Options | What you get |
|---|---|
| Outlook.com | If you get your mail via Microsoft servers, this means that you will have an email that looks like Ike@outlook.com, Ike@live.com, Ike@hotmail.com, or Ike@msn.com |
| Office 365 | If you get your mail through the company's exchange or you make use of Microsoft 365 which used to be known as Office 365 to control your mailing activities. |
| Google | If you own a Google account, often an email address that looks like Ike@gmail.com; or you can also use Google's servers for email as you can choose to work with Google Workspace, or you have just opened a new email address with Google and you would like to get your mail via Google. |
| Yahoo | If you obtain your email from Yahoo, your email is going to look like Ike@yahoo.com. |
| iCloud | If you happen to have an Apple account, you will have an email like Ike@icloud.com, Ike@me.com, or Ike@mac.com address. |
| Other | If you make use of any other type of email address. When you type your email address, Microsoft gets to look out for a bunch of associated information like POP or IMAP server name in its enormous database and can often always set you up with just a click or a touch. |

People who often try to make use of the work email on a computer may have a need to speak with their IT department for more configuration

options. If you signed into Windows 11 with the use of a local account and include a Microsoft account in the Mail app, you will be required to make a choice if you would like to change that local account into a Microsoft account everywhere. **There are basically three layout columns in the Mail app;**

- **The left column has a bunch of icons that can be used to tell the following;**
    - The hamburger (three lines) icons located at the top enable you to take a look at all of the various options you have when you minimize the left column.
    - The plus icon begins a new message.
    - The person icon enables you to switch among various accounts if you have more than one account.
    - The folder icon enables you to switch between your inbox, outbox, archive, and so on.
    - The envelope icon does not do anything when looking at your email. If you are making use of any of the other Microsoft apps, selecting or touching the **envelope icon will take you to the Mail**.

    - The calendar icon opens the Calendar app.

- The two people icon launches the People app.
- The check mark will take you to Microsoft's To-Do app.
- The gear icon will bring up a Settings pane.

- The middle column makes a list of all the messages in the chosen folder. If you don't manually choose a folder with the use of the file folder icon and select or touch to **pin the specific folder- Mail chooses the inbox for you.**
- The right column displays the chosen message.

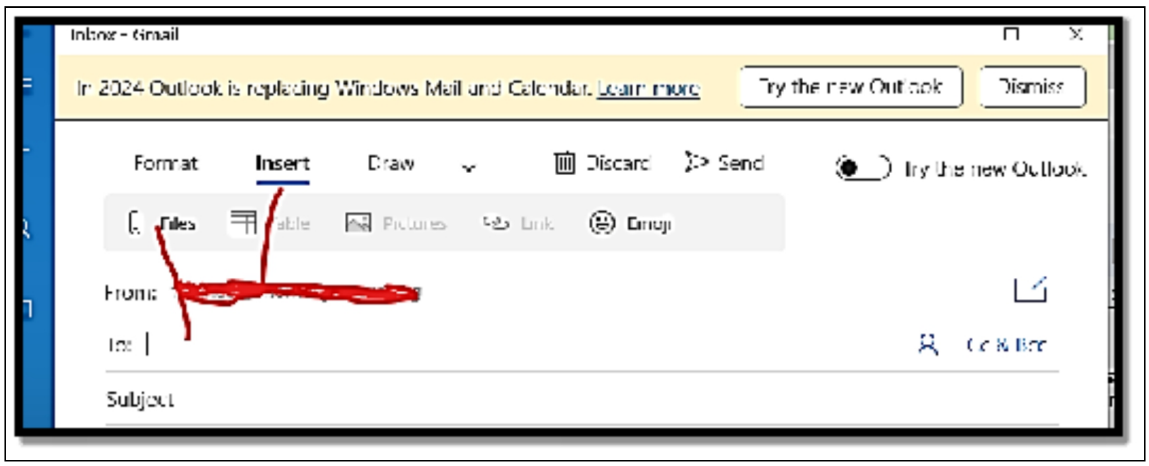
## Create an email message

Whenever you reply to a message, Mail configures a typical reply in a three-column screen. Also if you select or touch the **+ icon in the upper left**, Mail starts a new, blank message. If you reply or start another message, your message will be configured and ready to go; all you have to do is just start typing.

- **Formatting text**: The new text you type will be shown in Calibri 11-point type; which is a good all-around, middle-of-the-road choice. If there is a need for you to change this, just choose it and select or touch the down arrow to the right of the underline icon.
    - Ctrl+B brings bold on and off.
    - Ctrl +I brings italics on and off.
    - Ctrl + U brings underline on and off.
    - Ctrl + Z changes the last action.
    - Ctrl + Y redoes the last action.
- **Create a bulleted or numbered list or add another paragraph formatting**: Choose the paragraph you would like to alter, choose or

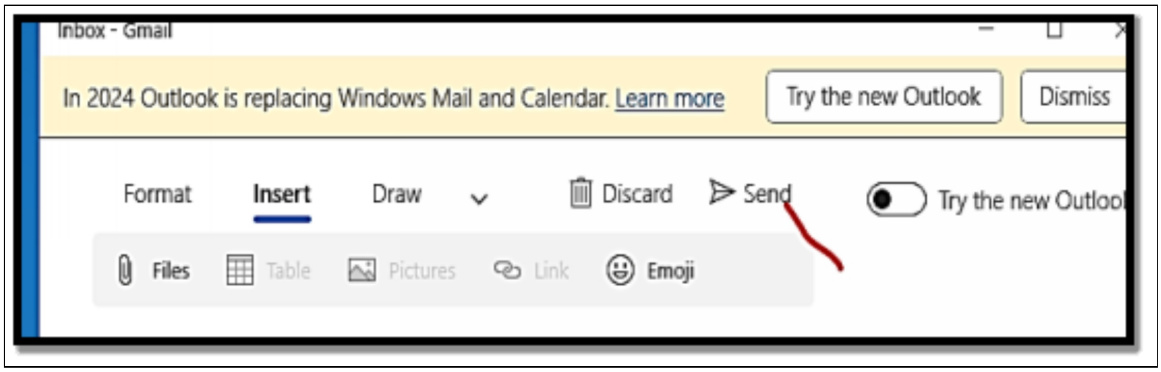
touch the paragraph formatting icon, and select from the many formats.

- **Add an attachment**: At the top, choose or touch **Insert > Files.**




You will then see an Open dialog box from which you can select the file you would like to attach. Choose or touch the file to choose it and then select or touch **Open**.

- **Add a message priority indicator**: At the top select the **Options tab and configure the message to either High or Low.**
- **Send the message**: Choose or touch the **Send icon in the upper-right corner and the message will then be queued in the outbox, ready to send the next time your Mail syncs for new messages.**




- **Delete or save message**: If at any time you feel that you won't have a need to send a message, choose or touch **the Discard icon in the upper-right corner**. If you would like to save a draft, you don't need to do anything; Windows 11 Mail automatically saves all the time.

## Looking for an email in the Mail app

**Looking for mail is easy if you remember two important details;**

If you have more than one account, move through to the account you would like to allocate before you conduct the search. If you search while you are checking the Gmail.com inbox, for instance, you won't get to see anything in your Outlook.com account.

**Follow the steps below to locate emails in your mail app;**

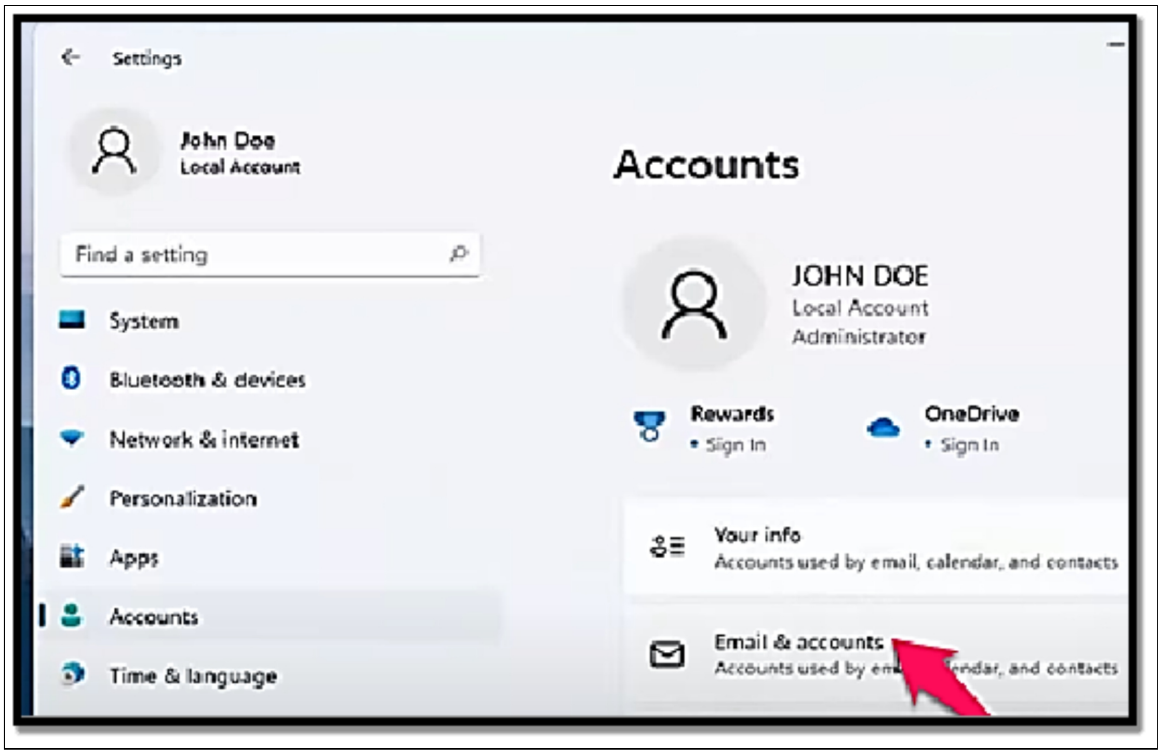
- If you have more than one email account, go to the account you would like to search.
- At the top, over the second column, choose or touch the magnifying glass.
- Insert your search item, and tap Enter or touch **the magnifying glass icon once more**. Your results will be displayed in the middle column. Choose or touch a **message, and it will be displayed on the right side of the Mail app.**

## Adding a new email account

The mail app has smarts that are in-built with which you can connect to any Outlook.com, Gmail, Exchange Server, Yahoo, iCloud, IMAP, or POP account. You can include any number of different types of those accounts; two different Gmail accounts and a few Outlook.com or yahoo.com.

**If you would like to add a new account;**

- From the Mail app, choose or touch **the gear icon at the bottom left.**
- Choose or touch **email and accounts**




**> Add account.**

- Insert **your email ID and touch Next.** Then insert your password and any other information that may be needed of you then choose or touch **Sign in**.
- If Mail shows you an option to make use of this account everywhere on your device, choose or touch **Microsoft Apps Only.**

If you would like to modify the details about your account, if you would not like to see the name Hotmail, or Gmail as an account name; choose or touch the gear icon, choose or touch Manage Accounts and then choose or touch the account you would like to change. The Account Settings pane

will then be displayed. At the top box, you can insert a name that will be displayed in the first column of the Mail main page. If you also would like to change the number of days worth of email downloaded or alter the sync frequency, choose or touch the link marked **Change Mailbox Sync Settings.**

## Using Microsoft Teams for Video Calls

Microsoft introduced its Teams app in 2016 as part of Microsoft 365 as an individual and corporate communication solution, perfect for corporate use as well as individual use. Since the COVID-19 pandemic broke out this year, remote working has slowly become the norm across industries; hence the necessity for an effective communication tool capable of meeting most, if not all needs for effective workplace collaboration. Microsoft Teams has now become integrated into Windows 11 with its own dedicated chat icon on the taskbar, much to Microsoft's boasts that this will be an impressive feature. Unfortunately, its implementation was underwhelming in my experience on some laptops due to incompatibilities between certain drivers and Microsoft's implementation; I reported this problem and hope it is addressed so everyone has an enjoyable and seamless Windows 11 laptop experience. You can host a Teams video conference on your Windows, either through the Teams app or from your browser.

**To conduct a conference via the Teams app, follow the steps below;**

- If you have not done this before, download the app from the official **Microsoft website or from the Microsoft Store.**

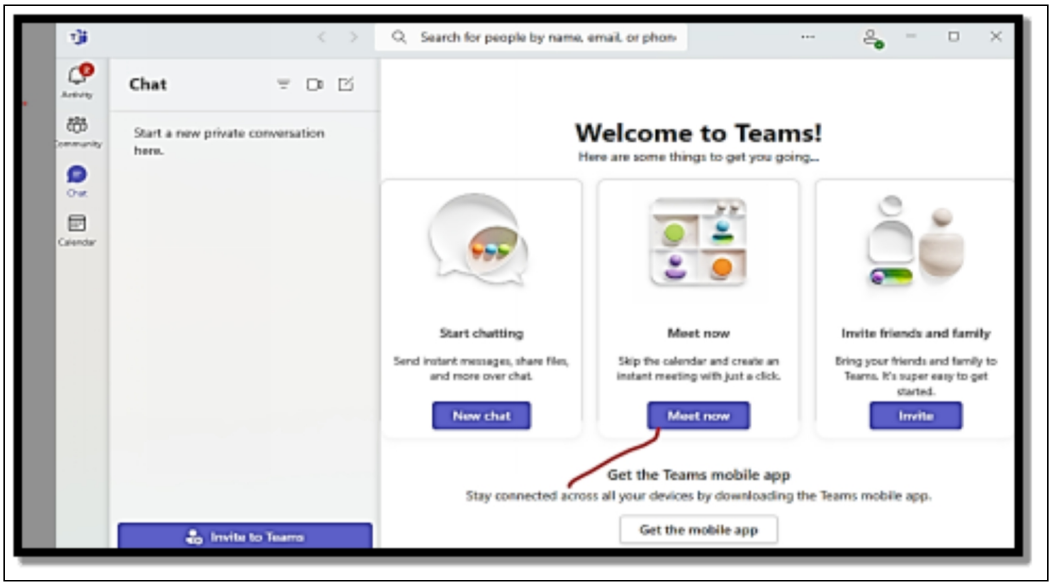
- Now open the Teams app, log in, and move to the team/channel where you would like to hold a video conference.

- Choose **the camera icon close to the Start a Conversation search box**.
- Configure a subject to the meeting, and then choose **Meet Now to open the video conference.**

If there is a need for you to avoid dealing with the application, you can launch the conference from your browser itself.

**Below are steps to get that done;**

- Navigate to the **official Microsoft Teams website, and sign in from there.**
- Choose the **Teams option and select a certain channel in which you would like to conduct a video conference.**
- After you are on a certain channel, choose **Meet Now**.



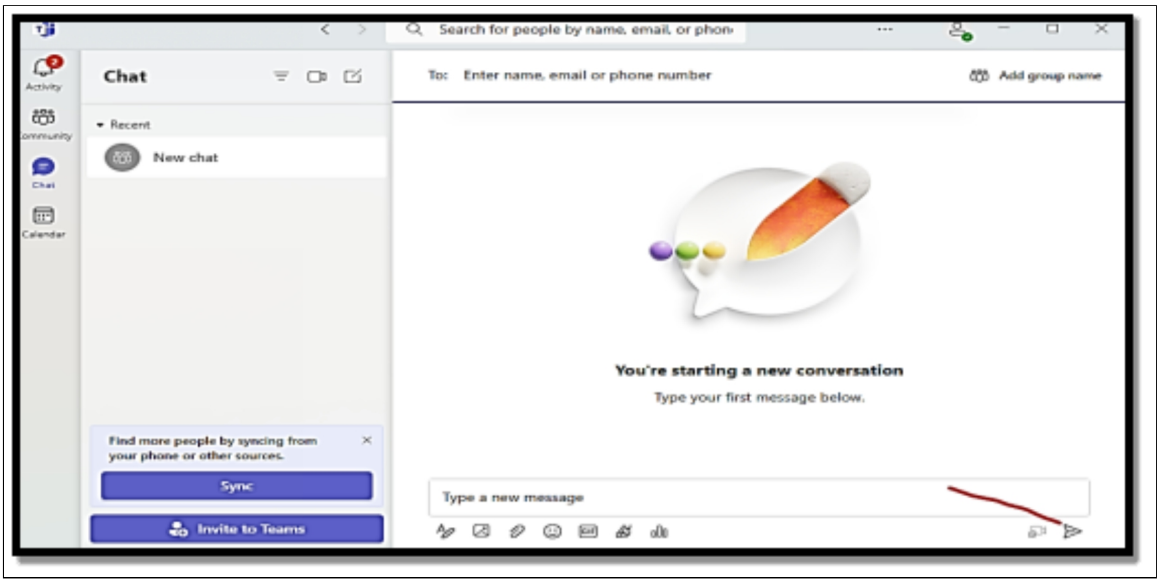

- Choose **Allow to enable Teams to make use of your camera and microphone**.

## Chatting from Windows 11

The chat icon on your taskbar aims to offer an easy and quick way of starting chat conversations and meetings on Microsoft Teams, once set up via its instructions in this article. With just a click or tap you can initiate chat conversations like so:

- Choose or **touch the chat icon on the taskbar.**
- Choose or touch the **Chat button.**

- In the To field at the top, insert the name, email, or phone number of the people you would like to locate on Teams.
- Choose the people you would like to chat with from the list. You can take steps 3 and 4 again and include more people to chat, creating a chat group in the process.
- In the **Type a New Message field at the bottom of the chat window**, type your message, and then choose or touch **the send arrow, in the lower-right corner.**




## Starting a meeting from Windows 11

**Microsoft Teams makes meeting setup easier than ever! Just ensure your webcam is installed and working before taking these steps:**

- Choose or touch **the chat icon on the taskbar.**
- Choose or touch the **Meet button.**

- Ensure the switches for your microphone and video are switched on; with this, others will be able to hear and see you.
- When everything is well configured just the way you would like it to be, choosing or touch the **Join Now.**
- Choose or touch **Copy Meeting Link** and then paste the link into an email message or chat window, where you invite others to join you.
- Choose or touch the **X button** for the invitation options and wait for others to come on board.
- When you want to leave the meeting, choose or tap **Leave in the top right.**

## Sharing and Collaborating on Documents

Windows 11 makes sharing folders simple for networked computers; here's how you can access one shared with you by others on a network. Shared folders offer an effective and straightforward method of collaboration and document sharing between computer network users; they make working together easier when working on projects as teams or sharing files with someone. Furthermore, their enhanced security provides greater control of

access permissions! But is setting up shared folders easy? Luckily yes - once you understand some basic steps and technical terms. So keep reading this guide on how you can access shared folders using Windows 11.

## Via the Run App

The Run utility in Windows enables you to open programs and files by typing their path or command in the Run dialog box. It is quite fast and easy to gain access to a shared folder in Windows 11. You can simply choose to insert the path of the shared folder in the Run dialog box in order to have it opened.

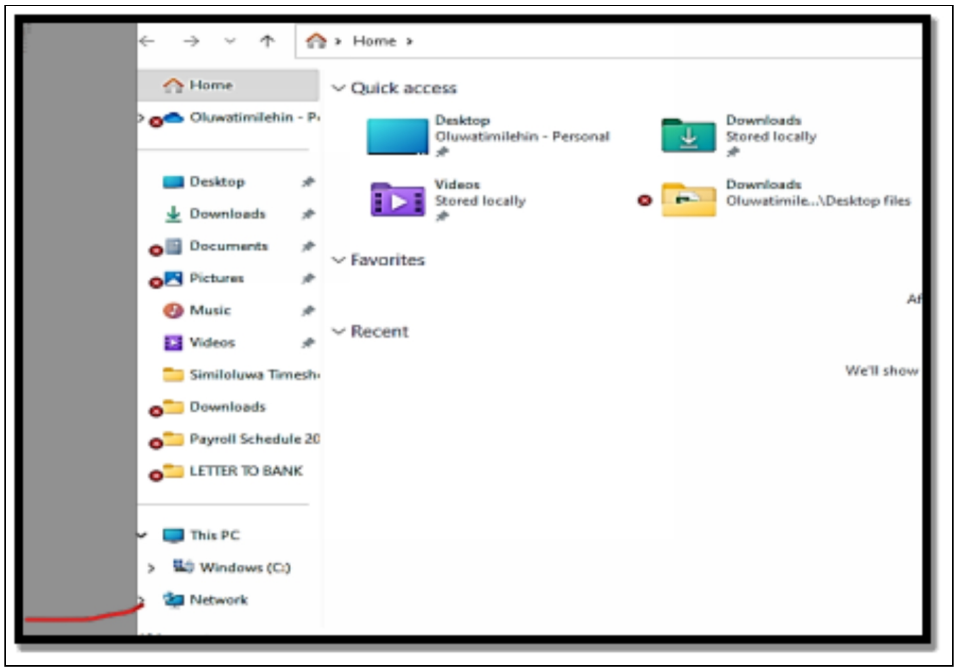
- Tap **Win + R to open the Run dialog box**.
- In the Run dialog box, insert **\\ComputerName\SharedFolder**. For instance, if the name of the computer is Computer-1 and the shared folder name is ADE, all you have to type is \\Computer-1\ADE in the Run dialog box.
- Tao the **Enter key to run it.**

Once the above step has been completed, your shared folder will now be opened on your computer.

## Using Network Option in File Explorer

Utilizing File Explorer's Network folder can also allow you to access shared folders on other computers and devices connected to your network. With this method, you are able to search and browse shared folders located therein.

- Tap **Win +E in order to open the File Explorer**.
- In the left panel of the File Explorer, choose the **Network option**. A list of all the computers and devices connected to your device will then be displayed.




- Open the computer you would like to access by clicking it twice.
- Once done, click **twice** on the shared folder to open it.

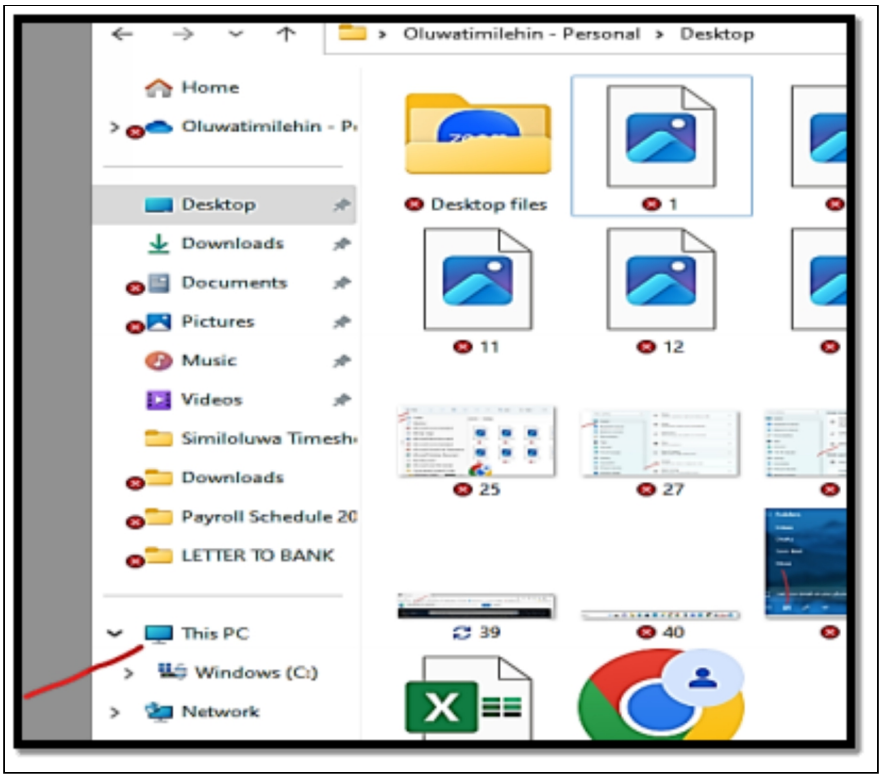
It is worth noting that this method will only work if you have the needed permission from the owner of your sign-in credentials and are correct in case password-protected sharing is switched on. In order to have quite an easy sharing experience, it is best you turn off password-protected sharing. This will help avoid any form of authentication or having to suffer from a failed sharing process when having to gain access to the shared folders on a network.

## Map the Network Drive

Mapping a network drive creates a copy of its shared folder in File Explorer so you can access it at any time as though it were any other folder on your computer.

**Below is how you can quickly map a network drive and gain access to its shared folder:**

- Tap **Win + E in order to open the File Explorer.**
- Choose **This PC** in the left panel of File Explorer.




- Choose the **Map network drive option** from the context menu.
- Pick a drive letter so you will be able to make use of it in accessing the shared folder from just anywhere on your computer.
- Choose **Browse** to make a choice of shared network folder location. Ensure the location is in the format: \\ComputerName\SharedFolder.
- Lastly, choose **Finish t**o leave the mapping utility.

Although the above-described process is not compulsory on Windows, it can make the shared folder much easier to locate and use than having to access it through a network path. Remember that mapping a network drive designs a shortcut to the shared folder. Hence, if someone gains access to your computer, they may also be able to gain access to the shared folder via the mapped drive.

## Access Shared Folders through Computer Management

Windows 11's Computer Management utility enables you to access shared folders. Computer Management serves as a valuable way of overseeing system tools, storage space, shared folders, and much more on your PC.

**Here's how Computer Management allows accessing shared folders on Windows:**

- Tap **the Win + X and select Computer Management** from the power user menu.
- Expand the **System Tools section in the Computer Management window**.
- Choose **Shared Folders > Shares.** This will show a list of all the shared folders on your computer.
- Click **twice on the folder you would like to access to open it**.

## Activity

1. Set up your email and calendar.
2. With the use of Microsoft Teams, make video calls.
3. Share and collaborate on documents.

# CHAPTER 9
# SECURITY AND PRIVACY

No one likes being alarmed, but computer attacks continue to grow increasingly frequent and severe each year. While media attention may focus on large data breaches like those at retailers or government, don't assume the bad guys wouldn't try getting into your computer too if there is valuable personal data stored therein that they want to be stolen for ransom, computing resources/bandwidth taken, or your PC used as a gateway into larger targets with whom you do business - there are always actors with malicious intentions! This chapter covers a range of threats you're likely to come across at home and in your office, before providing an introduction to Windows 11 security tools and technologies--many hidden within layers, like hardware-based protection operating before Windows loads. All retail and OEM versions of Windows 11 come equipped with the Windows Security app, serving as an intuitive dashboard for common security features such as Firewall, Antivirus, and SmartScreen protection.

## What are security threats?

Years ago, the threat landscape for Windows users was totally controlled by viruses and worms. But the modern threat landscape is much more complex and also quite insidious. In our world today, an attacker is most likely going to be a part of an organized crime ring or even act on behalf of a state-sponsored organization, and oftentimes, attacks are designed to go unnoticed for as long as they can be.

Unwanted software installed without your knowledge and running without your awareness may perform malicious acts and transfer data without consent; such malicious code is often known as malware. Bad guys aim to get you to install and run their software, typically Trojans--programs that appear legit but perform malicious actions after installation. Social engineering techniques (typically

using popular social networking websites like Facebook and Twitter) are used by cybercriminals to convince victims to install this form of malware themselves, often by way of convincing downloader programs which then install additional unwanted applications onto an infected machine; other Trojans install back doors which allow remote attackers to gain control.

**Below are just quite a few examples;**

- A password stealer runs in the background, compiles usernames and passwords then sends them to an outside attacker. The credentials that have been stolen will then be used in making diverse purchases, wiping out bank accounts, or committing identity theft.
- The fastest-rising start in the malware hall of shame is still ransomware, a form of digital extortion in which a program will encrypt all of your data files and opt to unlock them only when you pay a ransom.
- Phishing attacks which are social engineering to convince visitors to give out their sign-in credentials are often a separate but potentially devastating avenue to identity theft that can strike in any browser making use of just any operating system.
- Bad guys also prey on fear with rogue security software which tends to imitate the actions and appearance of legitimate antivirus software. If you install their program, it will inevitably report the presence of a virus and also offer to remove the alleged malware for a fee. A related category also includes tech-support scams in which a Windows user gets a phone call from a scammer pretending to be a Microsoft support professional.

In the sections below, you will learn a lot more about what can be done to ensure you do not fall victim to the above-listed examples. This section is very important hence you are expected to pay rapt attention and ensure you put to use all you learn.

## Windows Defender Firewall and Antivirus

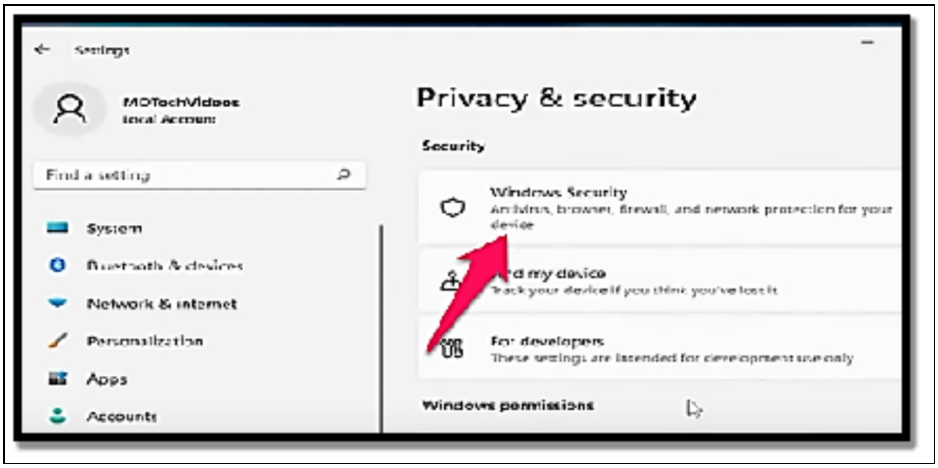
A firewall is a program that serves to stand between your computer and the internet, protecting it from all manner of baddies lurking there. An inbound firewall acts like traffic police allowing only good content into your computer while keeping all negative responses out on their proper place on the web - An outbound firewall is used when something like your computer becomes infected with viruses or otherwise starts sending bad information outward; an inbound and outbound firewall is then also deployed simultaneously for extra defense against cyber threats and security risks on either end! Windows includes a good inbound firewall. Unfortunately, however, its outbound firewall has all of the social graces of an off-leash dog - you never even see it unless you learn its magic incantations! Unless someone pokes their nose into Windows Doghouse to teach it some new tricks. Outbound firewalls tend to bother you mercilessly with inscrutable warnings saying that obscure processes are attempting to send data. If you simply select through and let the program phone home, you are already defeating the purpose of the outbound firewall. On the other hand, if you also take your time to track down every single outbound event warning, you may spend about half of your life having to deal with prompts from your firewall. The Windows Defender anti-malware package has seen a lot of improvement since it was introduced initially and the version that has been included with Windows 11 is quite very good at getting at and eliminating malware. Most people can get by simply making use of the Windows Defender antivirus component without having to install a secondary antivirus or anti-malware package. It is worth noting that some antivirus programs are better rated than Windows Defender in terms of getting and eliminating new and unknown malware, but the firewall component of Windows Defender does a good job which is just enough in most situations.

Windows Defender is usually turned on by default and, if you do not have any other firewall running, you ought to have the default firewall turned on. If you have mistakenly turned Defender off and you have no antivirus installed on your PC, you are at risk of getting your computer affected by malware. Without a firewall, your computer is vulnerable to external attacks.

**Below is how you can turn the Windows 11 firewall on;**

- Right-click the **Windows icon on the taskbar.**
- Choose **Settings**.
- Choose **Privacy & Security**.

- Choose **Windows Security.**




- Choose **Firewall & network protection.**
- If you notice the firewall is turned off, you will see **a red x icon** in the Firewall & network protection aspect and a button. Choose the Turn on button to switch on the firewall.
- The firewall will switch on **the red x and change into a green check**, and the button will then leave. You can choose the Firewall & network protection icon to check the configurations of your firewall.

- Select **Public network to check the configurations of your firewall.**
- If the firewall is on, the Microsoft Defender Firewall toggle will be on.
- If you choose the toggle, Microsoft Defender will switch off, and you see a red x with a warning message. Please do not select this toggle and switch off the firewall if you don't have a good reason for it such as if you have another firewall installed through a third-party anti-malware suite.
- If you see the Firewall & network protection screen with the use of your public firewall off, you will see this warning message. If the screen looks like this for you, choose to restore settings or choose **Public network > Microsoft Defender toggle to switch on your firewall.**

## Is Windows Defender the Same as Windows Firewall?

Microsoft Defender is an anti-malware component built into Windows 11. While Windows Defender commenced as a fairly basic antivirus program, Microsoft Defender incorporates anti-malware functionality, real-time protection, browser integration for Edge and Chrome, and controlled folder access to help protect against ransomware, a firewall, and other anti-malware features. If you happen to see a reference to the Windows firewall, it is the firewall functionality of Defender being referenced. There is no Windows firewall different from Defender, as Defender is Microsoft’s all-in-one anti-malware package. Windows 11 firewall is automatically turned on after installation; all it requires to stay enabled is doing nothing and letting time pass before changing settings for it to switch itself back on when needed. Should something cause it to switch off immediately, make manual changes. To reactivate a firewall, just follow the steps outlined above. If yours was ever disabled and there were no other firewalls running at once, an alert in the Firewall & Network Protection menu with instructions to reenable will display.

## Antivirus

Although Windows 11 includes a slicker user interface than Windows 10, the integrated Windows Defender stayed more or less the same. Although it is secure, there is some malware that it cannot protect you from and this is just where a third-party antivirus program will come in. Third-party antivirus software is quite indispensable for Windows 11. Since Windows is the most popular operating system, most of the malware is designed specifically to target it. Malware, though, can come in many forms, from phishing emails, and attachments, to USB drives and also malicious links. An antivirus helps to get your device well secured even from immediate threats or attacks, working as an extra layer of security. In this section, you will learn about the various things you need to look out for before settling on the kind of antivirus you would like to make use of.

## Choosing the best antivirus for Windows 11

Getting a new operating system also comes with the need for you to start thinking of the perfect anti-virus you need to get to ensure your all-around protection against any form of threat.

**Below are a few factors you should keep in mind when making a choice of the best antivirus for Windows 11;**

- **Independent organization lab scores**: certain labs do antivirus tests and also share the results on how well a service helps to protect from various threats. The factors shown are usability, performance, and protection. When making a choice of an antivirus service, you can choose to check both AV-Comparatives and V-Test ratings, this way you will be able to see which one will be able to protect your device efficiently.
- **Efficiency**: The normal background scans done by antivirus software can consume your memory and CPU. This is one of the reasons why you ought to ensure that your antivirus won't congest your device by selecting a lightweight solution.
- **Features**: While certain antivirus tools just help with the scanning of your device for malware, others help to add more features. For instance, parental controls help you keep an eye on your child's online activities or webcam protection to help

you get secured from prying eyes. Various services have bespoke advantages that you ought to choose in accordance with what your needs are. Powerful antivirus for Windows will also have an in-built VPN, a password manager, an ad blocker, and any other cybersecurity tools.

- **Customer support:** Since the sole aim of the antivirus is to protect your device at all times, available customer support is also a huge benefit in case you find yourself in a difficult situation. Even if you just do not comprehend anything, you ought to be able to get help with ease, especially if the software is one you paid for.
- **Price**: The highest-priced antivirus doesn't mean it is the best at protecting you from malware. Antiviruses can be quite different in the way they detect malware and the features they offer. You ought to be aware of your own personal needs to ensure that you get value for your money.

Examples of some of the antivirus widely used include TotalAV, Bitdefender Antivirus, Norton360, Surf Shark Antivirus, and Avira Antivirus amongst others. Do well to do comprehensive research before you decide to choose any of the options listed above.

## Privacy Settings and Permissions

Doing your own due diligence regarding privacy issues shouldn't require being an outspoken conspiracy theorist. Some companies abuse your trust by gathering personal data without your knowledge or approval and selling or sharing it with parties who hope to profit from it. Even reliable third parties can become compromised and allow your personal data to be stolen through security breaches on their servers. European organizations (such as Microsoft) must comply with the General Data Protection Regulation (GDPR), which mandates stringent privacy safeguards when collecting, processing, and storing personal data within Europe. California recently enacted a similarly stringent privacy law; some privacy activists believe these protections should extend globally. Windows 11's integration of cloud services means some of your information may be stored, with your permission, on Microsoft-owned servers. After first sign-on, Microsoft

requests permission to use some of this data in personalized suggestions while at the same time sharing diagnostic (telemetry data) so as to enhance system reliability.

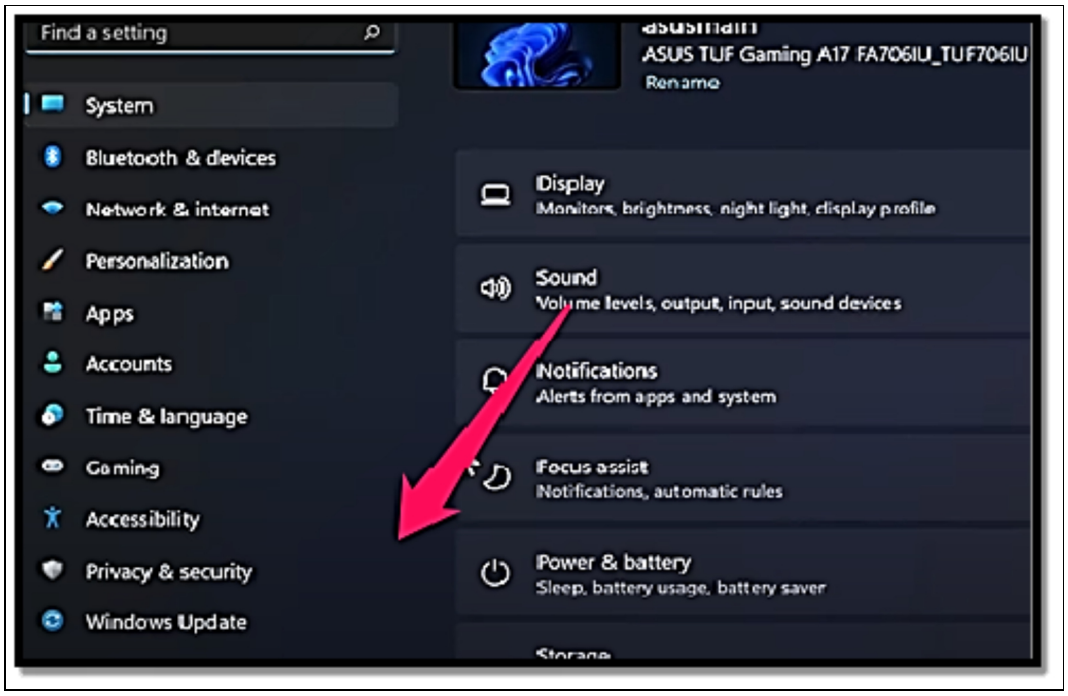
Diagnostic data collected by the Connected User Experiences And Telemetry service entails information about how a device is configured, with respect to hardware attributes like CPU, installed memory, and storage space; quality-related metrics including uptime/sleep metrics as well as crash/hang statistics being recorded as required data by this service; additional required details include installed apps/drivers list as required information whereas optional diagnostic data might include events analyzing interaction between user, OS, and apps and collected diagnostics as an extra service feature. Microsoft claims its diagnostic data system is specifically tailored to address any privacy concerns. They collect only limited data pertaining to users - anonymous device ID and type; we take several precautions not to collect anything that directly identifies you such as name, email address, or account ID." Some of your personal information is often used for the provision of more important advertising in applications. If you choose to switch off that personalization, you will still see various ads but those ads will not be dependent on your browsing history or any other information about you. Irrespective of your privacy configurations, Microsoft does not make use of the contents of your email, chat, files, or other personal content to target ads. Just one statement about privacy covers almost all of Microsoft's consumer products and services which also include Windows 11 and all other related services.

More importantly, Windows includes a raft of options for controlling your privacy. You will have to locate them under the Privacy & Security heading in Settings wherein you can choose to indicate the applications that are allowed to make use of your devices on your computer if you are to disclose your location if you are to enable Windows to make use of cloud-based speech recognition, and so on. For every privacy option, you will locate a link to the Microsoft privacy statement and links to more information as well as the controls for viewing and modifying configurations. The privacy

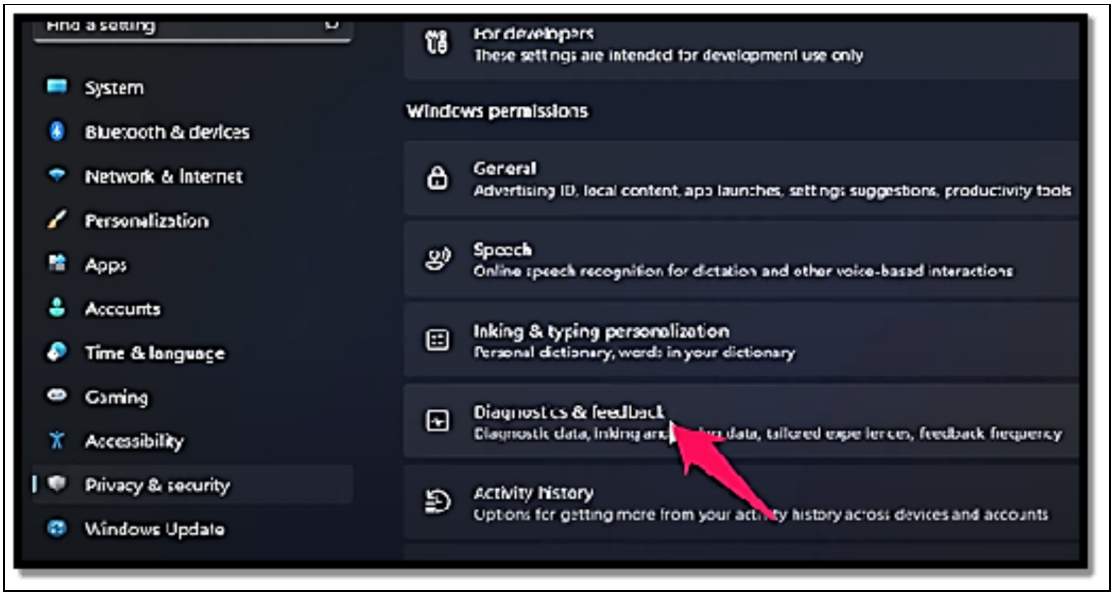
statement is clearly written, and it is also an important aid for making the decision of the very options you are to enable.

You ought to also examine each of these options very well in order to decide for yourself where the proper balance should be between your personal privacy and convenience. If you would like to reduce the collection of diagnostic data, for instance, go to **Settings**

**> Privacy & Security**




## Diagnostics & Feedback

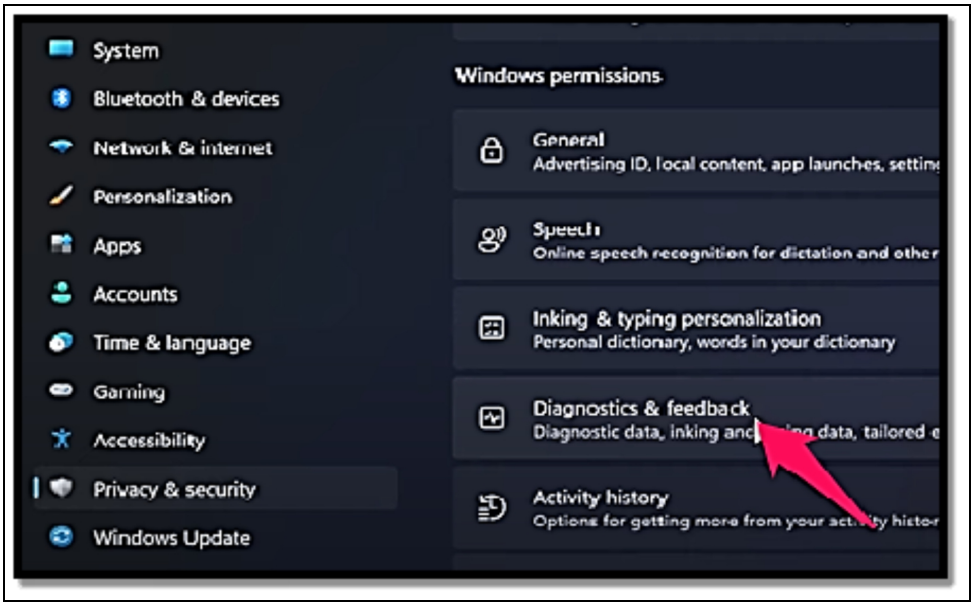



Beneath the **Diagnostic Data heading**, configure the **Send Optional Diagnostic Data toggle to off**. It is worth noting that on PCs that are set as part of the Windows Insider program, switching this configuration off will prevent the PC from getting Insider preview builds; a message will be displayed at the top of the screen if you choose this configuration. Through Group Policy and device

management software, it's possible to disable diagnostic data collection on devices running Windows Enterprise and Education editions only; using it with Windows 11 Pro bypasses this setting instead of using Send Required Diagnostic Data settings. Since disabling Windows Update also disables Windows Update functionality it should only be utilized if an alternative update mechanism such as Windows Server Update Services exists.

Launch **Gpedit.exe locally and navigate to Computer Configuration > Administrative Templates > Windows Components > Data Collection and Preview Builds t**o view and adjust these settings. Double-click **Allow Diagnostic Data, set its value to "Enabled," and double-click again when considering all three levels under Options**. Two advanced tools allow you to view and manage diagnostic information about your computer. They're currently supported on all editions of Windows 11. Diagnostic Data Viewer, an app that presents collected information directly, allows you to see precisely what Microsoft receives.

- To use Diagnostic Data Viewer, navigate to **Settings > Privacy & Security > Diagnostics & Feedback**




**And expand the View Diagnostic Data section before setting on switch for View Diagnostic Data section before clicking Open Diagnostic Viewer button**; Diagnostic Data

Viewer also features search and filter features so you can narrow display of diagnostic details.

From this same Settings page, you can also request Microsoft to delete diagnostic data collected from the current device. To do this, expand the Delete Diagnostic Data section and click Delete; Windows then displays "Last Delete Request Date" next to this button.

## Preventing unsafe actions with User Account Control

User Account Control comes into play anytime a user or an application attempts to do a system administrative task, it requires the consent of a computer administrator before proceeding on what could be very risky.  UAC was widely scorned when it was brought in as part of Windows Vista in 2006, but the feature has since become an effective security aid without the need for the annoyance factor that plagued the original implementation. UAC works in sync with a particular feature known as Mandatory Integrity Control which helps to assign a measure of trust known as integrity level to every system object, which includes processes and registry keys. Processes that execute at the System integrity level cannot be accessed in a direct manner by any user account. A process with quite a High integrity level is one that has the capacity to modify the system data and also needs the access token of an administrator. Almost all normal processes execute with a Medium integrity level and have a need for a standard user access token. In Windows 11, standard user accounts can help to execute all usual daily computing tasks but are usually prevented from executing any process with a High integrity level. These restrictions apply not only to the user alone but also more importantly to any programs opened by the user. At sign-in, Windows designs a token that will be used for the identification of the privilege levels of your account. Standard users get a standard token but administrators get two; a standard token and an administrator token.

**Among the actions that trigger the use of the UAC prompts;**

- Installing and uninstalling most desktop applications with the exception of those converted into application packages and sent through the Microsoft store, or those that install totally into the user profile.
- Installing device drivers that are not included in Windows or provided via Windows Update.
- Installing ActiveX controls which are also still supported in Windows 11 in Microsoft Edge Internet Explorer mode.
- Changing settings for Windows Defender Firewall.
- Changing UAC settings.
- Configuring UAC settings.
- Configuring Windows Update
- Adding or removing user accounts
- Changing a user's account type
- Running Task Scheduler
- Editing the registry
- Restoring backed-up system files
- Viewing or modifying another user's folders and files.

Within the classic Windows desktop interface (including remnants of the Control Panel that have yet to migrate into Settings), many actions that require elevation can be identified ahead of time. A shield icon next to buttons or links indicates a UAC prompt will appear if using standard accounts; Signing into Windows with an administrator account, while leaving UAC settings unchanged, may reduce consent prompts significantly compared to using standard accounts. That is because, by default, UAC settings use an "Admin Approval Mode," which only prompts when an outside program attempts to install software or make other changes on your computer, but not when making modifications yourself that would normally result in prompts for standard users with default UAC settings. Windows employs automatic elevation without UAC prompts for certain programs that make up its operating system, without going through an anticipated UAC prompt process. Programs elevated automatically are selected from a predefined list; digital signature verification by publishers of these Windows apps must take place, and their storage must occur only within specific folders.

# Multi-Factor Authentication (MFA)

Multifactor authentication is a crucial security technique that can help prevent hackers from accessing your Windows account. It is far more challenging for attackers to access your account when more than one form of authentication is required. We wrote this article to show you how to use the Microsoft Authenticator App to set up multi-factor authentication on your Windows 11 computer. Windows can be configured in a variety of ways for multi-factor authentication. One well-liked choice is to utilize a physical token in addition to your password, like a USB key. Utilizing biometric identification, such as fingerprint or iris scanning, is an additional choice. Alternatively, you can generate 6-digit tokens using the Microsoft Authenticator App, a secure soft token tool. Because it makes it far more difficult for attackers to access systems and data, MFA is a crucial security tool. Even if an attacker is successful in discovering a user's password, they still want the physical token in order to log in. As a result, attempts like phishing, brute-force attacks, and social engineering are greatly discouraged by MFA. Despite the fact that MFA adds an additional degree of protection, it's crucial to keep in mind that no security measure is faultless. Users should continue to be cautious when it comes to password security and keep an eye out for indications of account compromise. To further lower the danger of data breaches, MFA should be used in conjunction with other security measures like data encryption. **Below is a step-by-step procedure on how to set up multi-factor authentication on your Windows 11;**

- Start with configuring the **MF** by logging in to the Microsoft Account and choosing the **Security tab**.
- Choose **Advanced Security Options**.
- Click on Additional ways to verify or sign in; under the Advanced Security Options page, choose **Add a new way to sign in or verify** to add additional ways to verify or sign in.
- There are about 5 different ways you can use to verify or sign in;
    - The use of the Microsoft Authenticator App

    - Email a code
    - Making use of face, fingerprint, or a pin
    - Making use of USB, Bluetooth, or NFC device
    - Send a text code to the registered phone number
- Enable **Two-step verification**; beneath Additional security, you will find two-step verification is Off and click on **Turn on to configure it.**
- Follow the steps displayed to have the Authenticator app installed on your phone and then select Finish when the setup has been completed.
- Now that you have two-step verification status on, configure to sign in to your Microsoft account without the use of a password. Locate the Advanced Security Options page, and choose Add a new way to sign in or verify.
- Ways to verify or sign in include the use of the app, code from the email, the use of a security key, or code from a text message.
- Choose **an option to add a new Android phone**.
- Scan the **QR code from the Authenticator App to ensure the account is added.**

# Activity

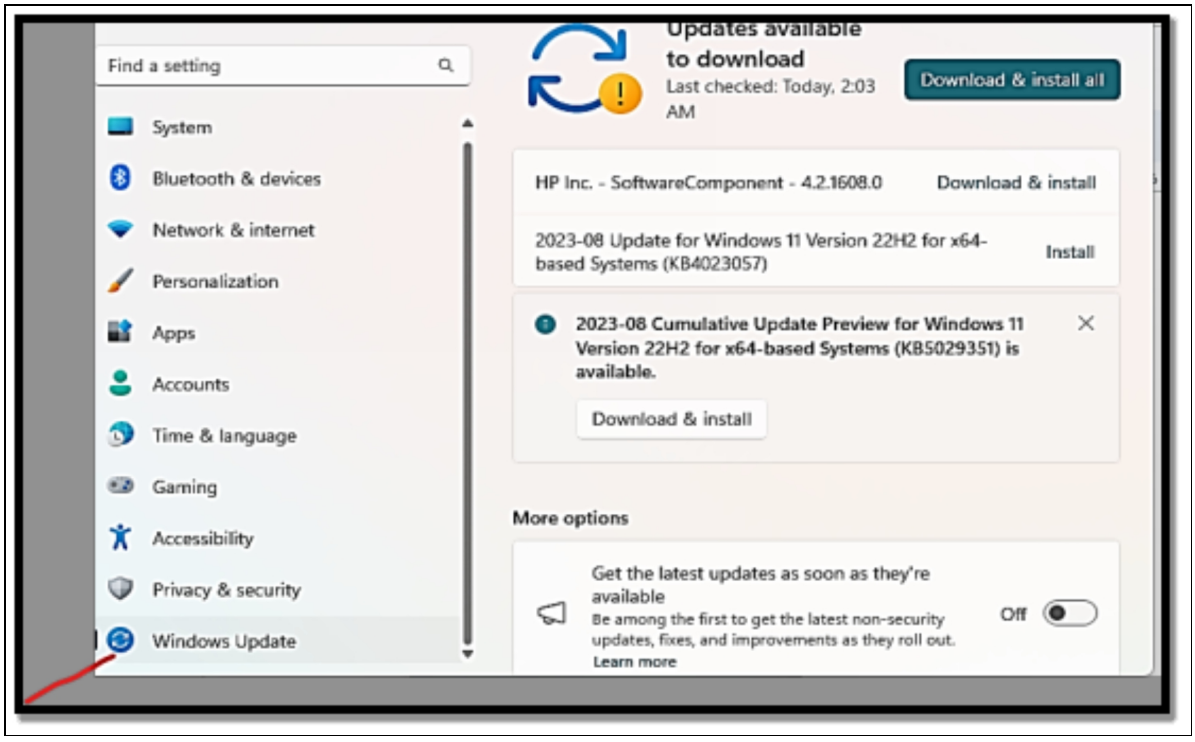
1. Enable Windows Defender on your antivirus.
2. Enable two-factor authentication on your system.

# CHAPTER 10
# TROUBLESHOOTING AND MAINTENANCE

## System Updates and Windows Update

Windows Update operates as a service that is configured to start when necessary. Its related services, such as the Background Intelligent Transfer Service (BITS), likewise function automatically with little to no maintenance from you other than the odd restart. We strongly advise checking in at regular intervals to ensure that updates are being delivered as anticipated and that the various Windows Update services are functioning properly.

- Enter **Settings > Windows Update to carry out this action.**




Even on a system that hasn't received an update in many months, you are likely to see, at best, a small number of updates when you

check for new updates in Windows 11. These updates can be divided into the following groups.

## Quality updates

In order to address security and dependability issues, Windows 11 receives so-called quality updates in cumulative packages that are geared toward each supported version. The fixes that are routinely released on the second Tuesday of every month, sometimes referred to as Patch Tuesday or, more technically, Update Tuesday, fall under this category. The most recent cumulative update for each version replaces all earlier updates. The most recent version of each quality update that is applicable to your Windows version is applied when you install the most recent cumulative update.

## Feature updates

The equivalent of a significant version upgrade is a feature update. They come out every year in the second half of the calendar year for Windows 11. These updates have their own set of control settings because they are substantially larger than quality updates and take a lot longer to install.

## Servicing stack updates

The program that updates the Windows operating system is known as the servicing stack. It also contains the component-based servicing stack (CBS), which powers a number of Windows-based deployment and management features, such as the Windows Features tool (OptionalFeatures.exe), the System Integrity Check and Repair tool (Sfc.exe), and the Deployment Image Servicing and Management command-line tool (DISM.exe). The updates for the servicing stack, which include reliability and security patches, are distributed as needed (usually not on a monthly basis). They are version-specific, and based on the Windows version that is currently installed; different servicing stack updates are available. The cumulative quality updates for a given month are normally supplied separately from them although usually concurrently.

Microsoft advises applying the most recent servicing stack update before downloading the most recent cumulative update if you are manually installing updates from the Microsoft Update Catalog as part of configuring a fresh Windows installation. Another suggested option for troubleshooting Windows Update issues is to manually apply the most recent servicing stack update.

## Driver updates

Through Windows Update, Microsoft distributes some device drivers and firmware upgrades. For instance, this channel is used to deliver hardware updates to all Microsoft Surface devices. To finish setup for devices that are not included in the Windows installation package, Windows Update offers some third-party drivers. It also occasionally replaces installed device drivers that have been identified as the root cause of serious reliability problems.

## Microsoft Defender Antivirus security intelligence updates

With the help of its own update system, Microsoft Defender Antivirus frequently downloads security intelligence updates—typically several times each day. When Windows Update is manually checked, it downloads and installs any security intelligence updates that have been made available since Microsoft Defender Antivirus's most recent check.

## Malicious Software Removal Tool

On Update Tuesday each month, the Malicious Software Removal Tool (MSRT) is routinely distributed. Its goal is to identify and eliminate common malware from Windows systems; it does not serve as a replacement for the thorough antimalware code present in Microsoft Defender Antivirus. In the background, MSRT runs automatically. It creates a log file and saves it as %windir%debugmrt.log.

## Deciding when and how updates are installed

All versions of Windows 11 come with a set of options that let you manage how Windows Update functions. To view these options, click Advanced Options. Windows Update will include other Microsoft products, such as perpetual-license versions of Microsoft Office, if you enable the Receive Updates for Other Microsoft Products switch to On. (Installations of Microsoft 365 have a different update procedure.) When updates are ready to install, several of the customary safeguards against unexpected restarts are bypassed by the Get Me Up To Date option. When working with a PC that hasn't been used in a while and is severely behind on updates, it's a suitable alternative.

Only if you have set up a metered data network connection, such as an inbuilt LTE modem or a mobile device set up as a Wi-Fi hotspot, can you use the third option, Download Updates over Metered Connections. Windows typically doesn't download updates in those situations to prevent piling up unforeseen fees for what is frequently a pay-as-you-go data plan. If you're confident that updates won't use up all your data allowance, turn this to On. The last option, Notify Me When a Restart Is Required to Finish Updating, offers one more opportunity for confirmation before Windows restarts itself to apply updates. Utilize this choice to reduce the likelihood of losing any work when a restart is necessary.

## Deferring and Delaying Updates

The level of control that administrators have over just how and when they can make updates on a device is based on the very edition of Windows that is installed on that specific device. It is worth noting that the following rules can be applied to public releases of Windows 1 and it is rather not available to Insider Preview builds. On various devices that are running Windows 11 Home, every update is usually delivered immediately on a schedule that is specified by the update of Microsoft servers. There are no options available to defer updates on this edition although you have the ability to pause any updates for up to five weeks, a week at a particular time. There is no need for you to take any more action except that you simply observe the

occasional reminders on when you should restart your computer and if you also choose to schedule a restart.

On devices that run Windows 11 Pro, Enterprise, and Education, the default configurations are the same as those that can be found in Windows 11 Home. As an administrator, you can however take advantage of more options, available as an aspect of Group policy; these configurations enable you to pause installation of quality updates by up to 30 days much after they have been made available by Microsoft and to defer installation of feature updates by about 365 more days. If you would like to make use of these settings, it is however mandatory for you to make use of the Group Policy, either as a part of the Windows domain, making use of the Active Directory, or making use of the Local Group Policy Editor, Gpedit. MSC. These policy configurations can be found in

- **Computer configuration > Administrative Templates > Windows Components > Windows Update > Manage Updates offered from Windows Update**.

**The various policies that can be configured include;**

- Choose **When Preview Builds and Feature Updates Are Received**; get this policy configured in order to be able to defer feature updates and, for devices that happen to be enrolled in the Windows Insider Program, preview builds. You can also choose to indicate a specified amount of time you would like to delay the update after it has been released. This value usually is inserted in days, with a delay period of up to about 365 days is allowed for feature updates in the General Availability channel and about 14 days for all channels that happen to be pre-released.
- Choose **When Quality Updates Are Received**; with the use of this policy, you can choose to defer the normal cumulative updates (which include security, reliability, and driver updates) for about 30 days. Deferring quality updates needs a balancing act; configuring this policy offers you an opportunity

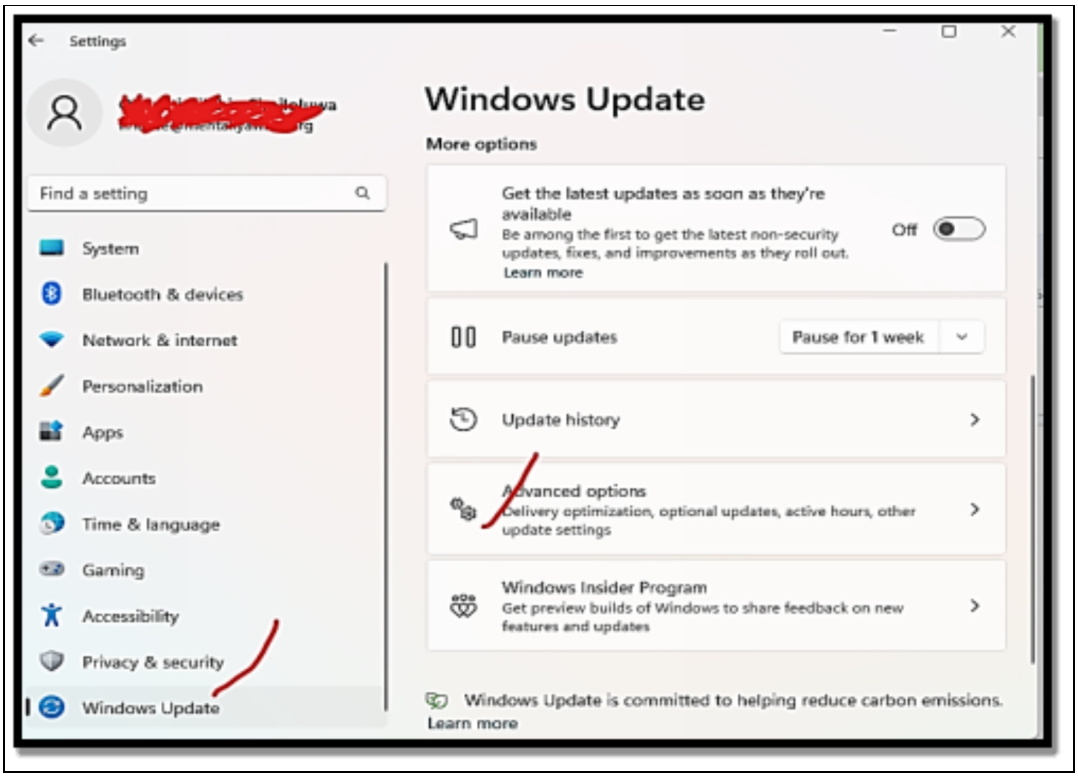
to test the latest update on a subset of PCs in your organization prior to deploying the update; that delay can also put other machines at risk due to the fact that they have not gotten potentially important security fixes.

- **Disable Safeguards For Feature Updates**: Normally, Microsoft helps to block the installation of feature updates on various devices that are known to have issues with compatibility. This policy is meant for administrators and developers who would like to evaluate a feature update on such devices as this, perhaps due to the fact that they have deployed a workaround or another form of mitigation for the problem.
- **Do Not Include Drivers with Windows Updates**; change this policy to ensure that Windows updates do not deliver any form of driver updates to the device.
- **Manage Preview Builds**; this policy includes various options to choose one of the three Windows Insider Program pre-release channels. There is also a fourth option that enables you to indicate that you would like to get only quality updates from the Release Preview channel.
- **Choose The Target Feature Update Version**; make use of this policy to indicate a particular feature update that you would like Windows Updates to provide to a device or a group of devices; make use of the version information as it shows under the Windows 11 Release information.

## Troubleshooting Common Issues

Windows Update is mostly dependable in my experience, although issues can and do happen. These issues can be divided into three groups: updates that create stability issues, updates that don't install correctly, and general Windows Update issues. The first line of defense for updates that cause issues is to delete the offending update. (This might necessitate booting into Safe Mode for more serious issues.) To view the list of installed updates (as explained in the previous section).

- navigate to **Settings > Windows Update > Update History,**




And then click the **inconspicuous Uninstall Updates link at the bottom of that page.** Like any operating system, Windows 11 occasionally encounters problems. These problems can occasionally be as simple as something affecting your internet connection, which makes websites load slowly. Other problems could linger longer and slow down the operation of your computer as a whole. Here are some of the most typical problems with Windows 11 and solutions for them.

**Most of the common issues with Windows 11 can include;**

- **The system needs a restart:** Installing a new driver and also updating Windows 11 itself can most times require you to restart your computer in order to fix the issue. If you have not had a cause to restart your PC for a long time; for instance about 5 days or more, restarting is a very good way to address any issue you might be having with the computer.
- **Your storage is running low**: Based on the type of storage device your PC is making use of, you may find yourself frequently jumping into performance issues which range from a

lagging system to tripping off if you have too many files on your computer. Clearing out storage space can be of immense help to your system to run smoother, especially if you are making use of the Solid-State Drive.

- **Software Compatibility Issues**: Ensuring your computer's software remains compatible is not an easy task. If you happen to have just updated your system, you may see that some of the applications you have do not offer full support for Windows 11 yet. You can choose to check Windows Updates in order to check if important updates are available and also check with the software developer to see if they plan to provide support for Windows 11.

Every computer provides diverse modes of configuration for Windows 11 to work across and there are times when Microsoft has not treated all the issues before it releases a new update. Below are the various things you need to be informed about in order to **solve some of the most common Windows 11 problems;**

- Restart your Windows 11 PC. Restarting your computer can be of immense help and can also solve many temporary issues with the system. If you start to experience issues, ensure the first thing you do is restart your computer to see if this will solve the problem.
- If restarting your computer doesn't solve the problem, you can then consider decluttering your system especially if the issue is related to your computer having slow performance. One very easy way to get this done is to delete junk files from Windows 11. As an alternative, if you have just installed Windows, give it some days to allow the system to get all of the files well sorted and positioned. There are times when it takes the system some days to get everything up and running. If everything fails, then you may need to downgrade from Windows 11 in order to get the performance issue fixed.
- If you notice that your Wi-Fi or ethernet connection is not working, there is then a need for you to open **Network > Wi-Fi** in order to be sure that a connection has been established. You

can start by trying to switch off the Wi-Fi or troubleshooting ethernet connection problems in Windows 11.

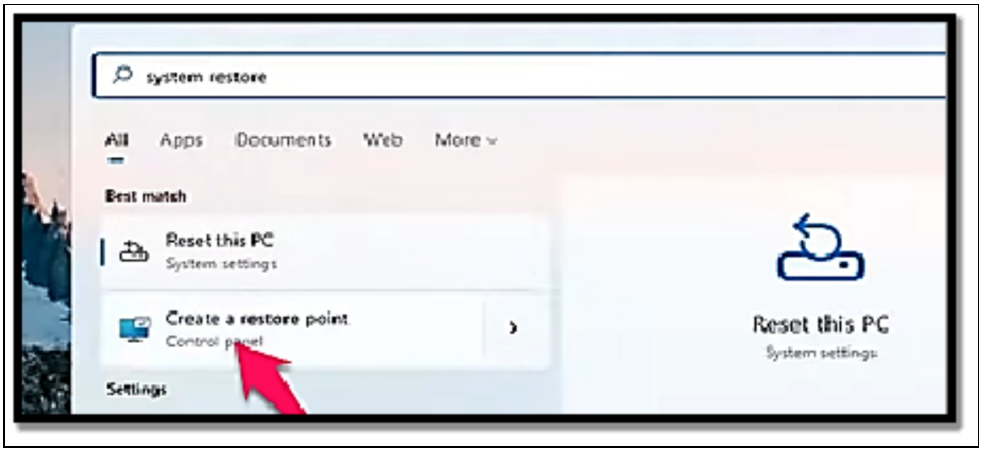
- Issues with updated applications and software. When new operating systems are released, software and app developers often update their apps in order to provide smoother experiences with the changes offered in the updated OS. If you happen to experience issues with your favorite application or software after you have installed Windows 11, there may also be a need for you to check to see if the app has updates that are available. You can often update through Windows updates, but there are times you may need to download updates with the use of the app itself.
- The sound isn't playing on Windows 11. Getting this issue fixed may also be as simple as having to unmute the volume mixer on your Windows 11 PC. If that does not work out, you can also troubleshoot sound issues in Windows 11 to get a better solution.
- Windows 11 won't shut down. A stuck app or other piece of software may prevent your PC from shutting down if you experience difficulties doing so. You might need to press **Alt + Tab to launch the task manager**, and then use the list of apps that appears to look for any problematic ones. To manually close those applications, choose the **End Task button**. By pushing and holding down the power button, you can also force your PC to restart. Do not use this to shut down your computer after each use; it is only advised when it won't shut down normally.

## Creating System Restore Points

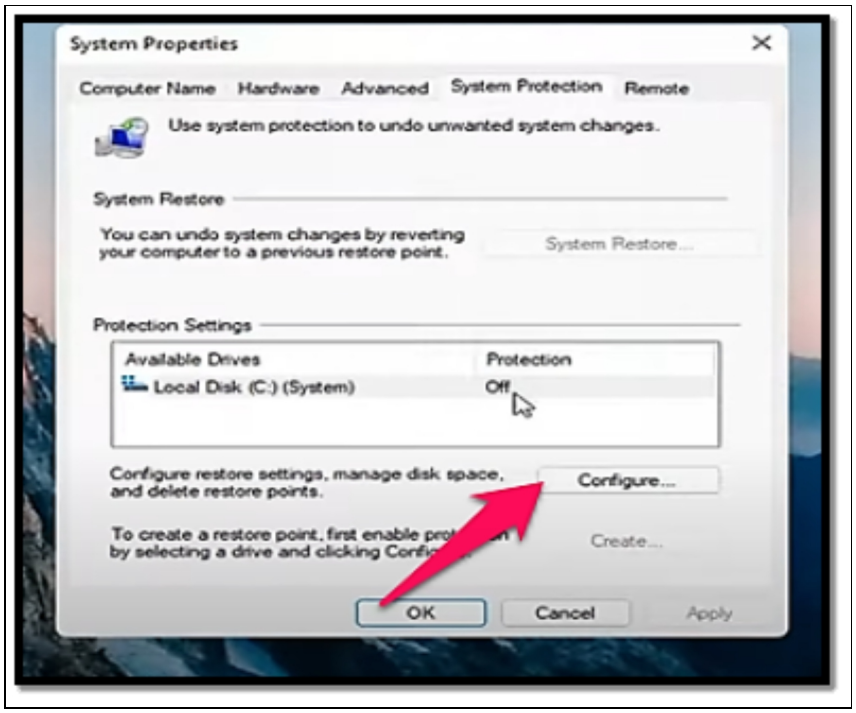
The collection of crucial Windows system files that System Restore stores on a specific date and time are known as a restore point, also known as a system restore point. System Restore allows you to go back to a previously saved restore point. System Restore won't function for you if your computer doesn't have any restore points to fall back on. You must go to the next troubleshooting step if you're trying to fix a serious issue. Old restore points are deleted to make place for fresh ones as this space fills up since the amount of space

that restore points can occupy is restricted. Applying one of the available restore points will allow you to restore Windows 11 to a decent working condition in the event that something goes wrong. This function can be viewed as a way to reverse system modifications. Your files won't be impacted by this functionality either. **Follow the steps below to create a restore point on Windows 11;**

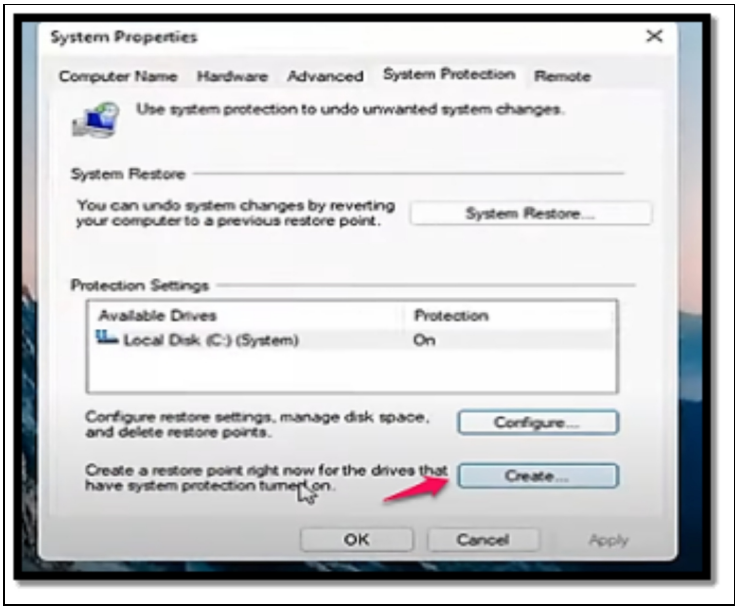
- Open **Start on Windows 11**.
- Locate **Create a restore point** and then choose the top result to have the app opened.




- Beneath the **Protection Settings**, choose the system drive (c) and then choose the **Configure button**.




- Choose **the Turn on system protection option.**
- Select **the Apply button.**
- Choose **the OK button**.
- Choose **the Create button** in order to create a restore point on Windows 11.
- Confirm a name for the restore point.
- Choose **the Create button**.



- Choose t**he Close button**.

## Recover Windows 11 with the system restore point

There are several ways to restore Windows 11 using System Restore. Restoring the system to a previously functioning condition via a restore point is possible if you have access to the desktop. You can use the recovery tool in Safe Mode or Advanced Startup settings if you don't have access to the desktop. To start your computer in Safe Mode, follow these instructions, and then carry on with the instructions below. Use these steps to access the Windows Recovery Environment (WinRE) if you are unable to start the device.

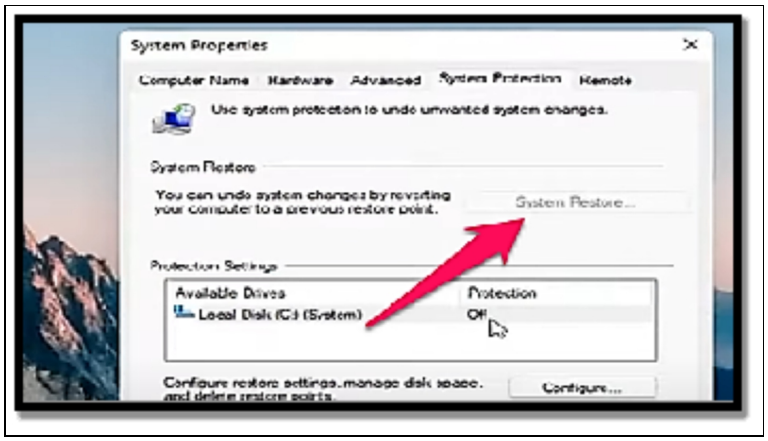
**Then proceed to step 4 below by selecting;**

- **Troubleshoot > Advanced Options > System Restore**.

**To recover Windows 11 with a restore point, make use of the steps below;**

- Open **Start.**
- Locate **Create a restore point** and choose the top result to open the app.

- Choose **the System Restore button.**




- Choose **the Next button**.
- Choose the restore point to recover Windows 11 to a good working condition.
- Choose **the Next button**.
- Choose **the Finish button**.

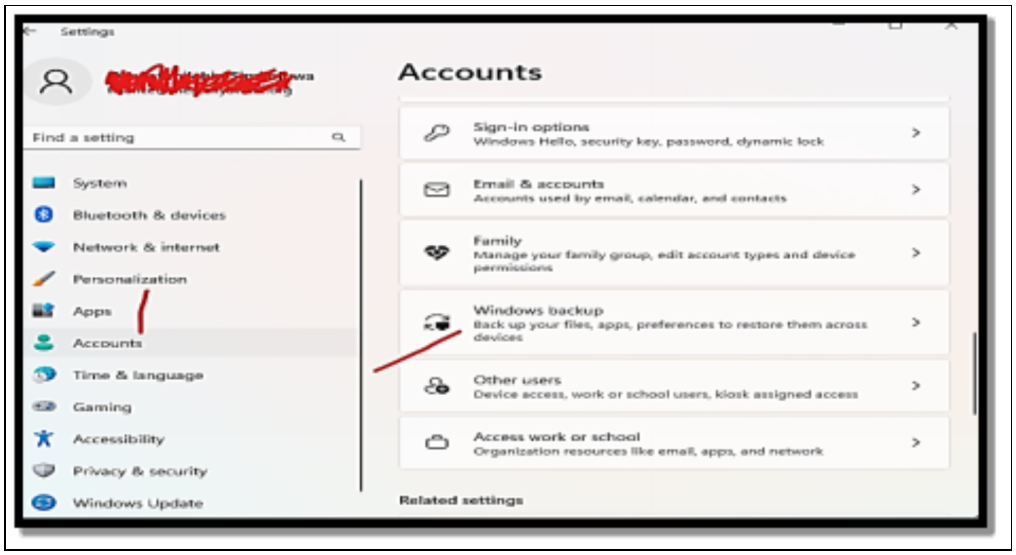
# Activity

1. Check your system and windows for updates.
2. Troubleshoot issues you might be having with your system for help.
3. Create system restore points.

# CHAPTER 11
# ADVANCED CUSTOMIZATION

Windows 11 provides you with countless possibilities for customizing your workspace, just like every prior version of Windows. These are the options that provide the impression that your computer actually belongs to you, reflecting both your personal design tastes and your preferences for how Windows should interact with you. The majority of these changes only slightly affect how productive you are. However, setting up a beautiful workspace increases your comfort level with your computer, and when you're more comfortable, you're more productive. I introduce Microsoft Windows 11's comprehensive portfolio of personalization capabilities with that objective in mind. The majority of the features covered in this chapter will be recognizable to anyone who has used Windows in the past, but there have been enough changes to the way they are implemented that it is advised you read this chapter again to see what has changed. The new Settings app now houses practically all personalization options; just a small number of legacy options, including the ability to change system sounds, remain in the traditional Control Panel. This is particularly important to keep in mind. You can choose to have your modifications apply to all such devices if you utilize numerous Windows PCs and log in using the same Microsoft account or Azure Active Directory (Azure AD) account. Expand the Remember My Preferences option under

- **Settings > Accounts > Windows Backup to change this functionality.**




To control whether certain preferences are synced between devices, check the Passwords and Language Preferences boxes. Themes, accessibility settings, and notification preferences are among the settings that are synced when the Other Windows Settings option is chosen. Keep in mind that each user's settings are synced separately. The currently selected theme or other synchronized settings do not include settings that are shared by all users on your computer, such as screen resolution. Default settings for a local user account.

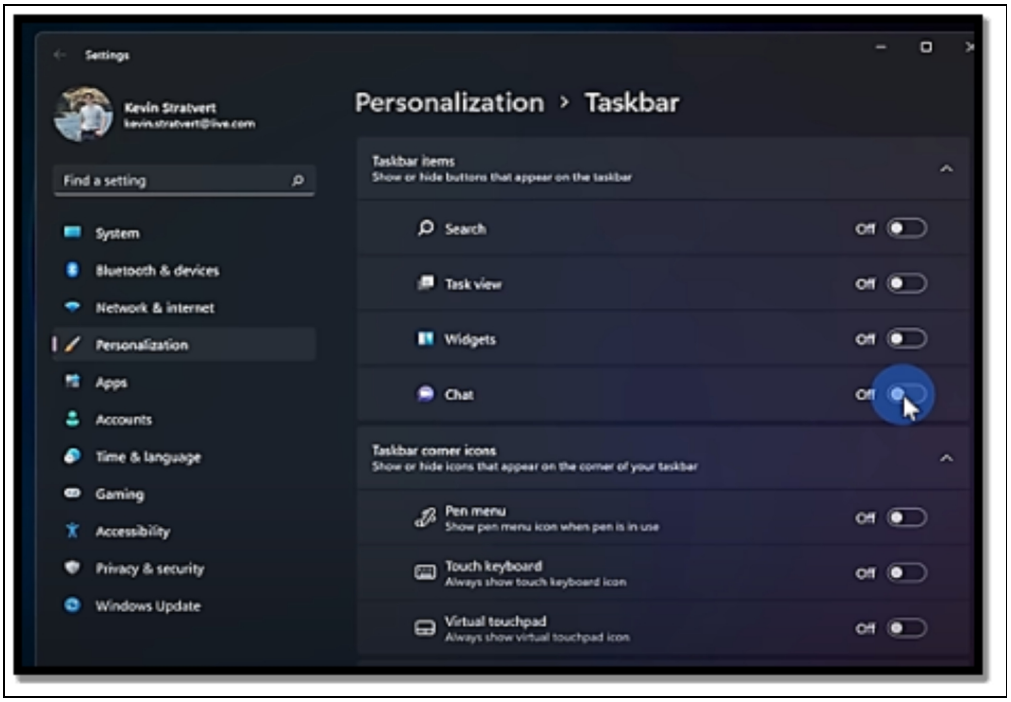
## Customizing Taskbar and Start Menu

Windows 11 is a huge improvement as regards visual appeal and features like the new Start menu, Widgets, and lots more. Nevertheless, Microsoft has obviously reduced the Taskbar customization options in its latest desktop OS. There is no option for you to drag the Taskbar to the side or top and you are also unable to modify the size. In this section, you will learn about the in-depth guide on how you can customize the Taskbar in Windows 11. If your preference is to customize the taskbar by positioning it at the top or you choose to drag the icons of the taskbar to the left side, you will learn about all of the possible options in this section.

## Change Windows 11 Taskbar Icons Alignment

Microsoft has made changes to the alignment of the Taskbar and Start menu in Windows 22. It has now been positioned in the middle by default. Nevertheless, if you would like to return to the default alignment like that which is obtainable in Windows 10, you can get this done by making use of the Settings app. To commence our journey of customization with the Taskbar get into the Settings app.

- Make use of the **Windows 11 keyboard shortcut i.e. Windows +I** in order to open the Settings app, and then switch to the **Personalization tab** from the left sidebar. Once that is done, choose **the Taskbar.**

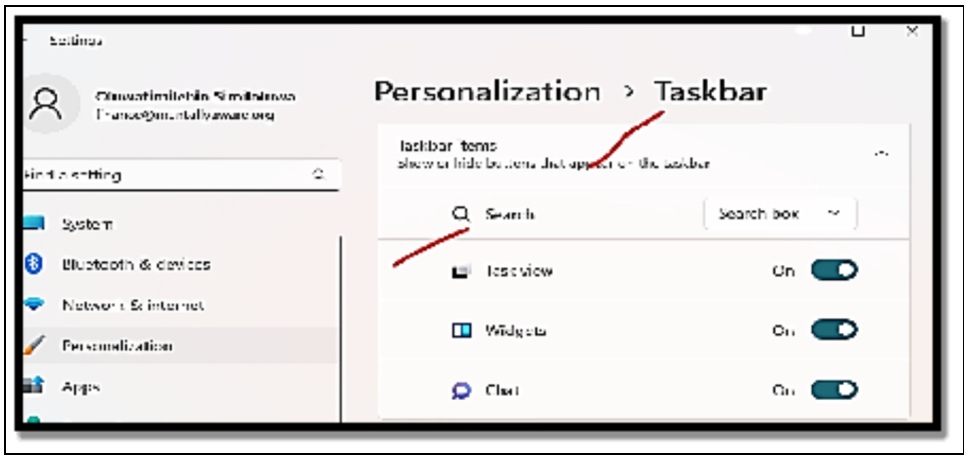



- Expand the Taskbar behaviors section and then configure the Taskbar alignment as left instead of center. With this, all of the icons of the Taskbar will instantly move to the left edge without a need to restart your Windows 11 PC.

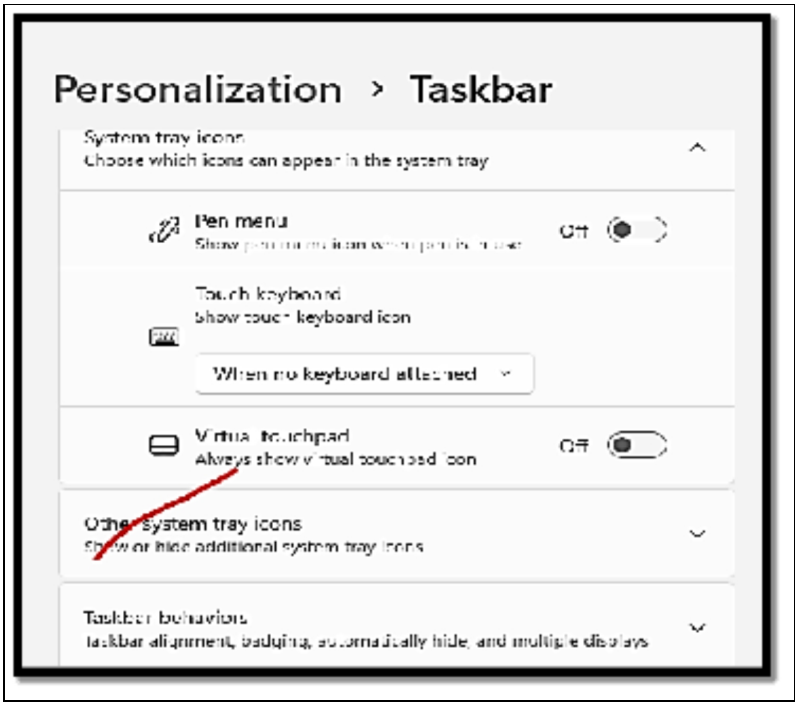
## Personalize Windows 11 Taskbar Using Settings App

- You can choose to personalize the menus, icons, and items of the Taskbar from the Settings page. Right-click on the **Taskbar**

**and then open Taskbar Settings**.




- Beneath Taskbar items, you can choose **to enable or disable the search box**, task view button, widgets panel, and **Team chat shortcut.**
- You can choose to add a pen menu on the Taskbar if you have a touchscreen Windows 11 computer with a stylus. Furthermore, you can also add a touch **keyboard and a virtual touchpad to the taskbar.**



- For the Taskbar corner overflow icons, you can decide which of the icons you would like to show and the ones you would prefer to have hidden. With this, you can customize the system tray icons on Windows 11.
- Lastly, under Taskbar behaviors, you can decide to conceal the **Taskbar** when it is not in active use, show badges on pinned apps, and enable the **Show desktop button** in the far right corner of the **Taskbar**. The very best part of this is that it is now possible for you to show the full taskbar with a clock on various monitors.

## Move the Taskbar to the Top or Side on Windows 11

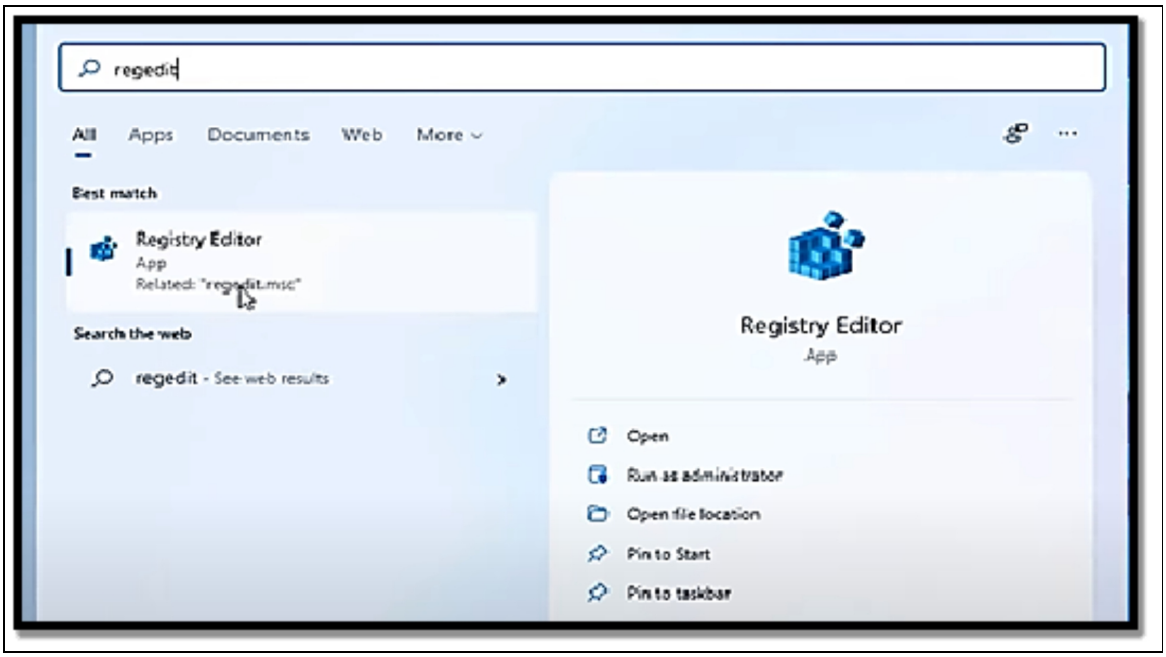
- To start with, download the latest version of ExplorerPatcher. Search on Google to get this.
- Once the above has been completed, run the program, it will then alter the appearance of the Taskbar to a Windows 10 style. Pause a little for some minutes so as to enable all of the modifications to be completed. If you would like to further customize it, right-click on the Taskbar and choose Properties.
- Beneath Taskbar settings, configure the **Primary taskbar location** on the screen to the Top. Lastly, choose **Restart File Explorer** at the lower part of the left corner.
- This will then move the Taskbar to the top after some minutes.

## Resize the Taskbar in Windows 11

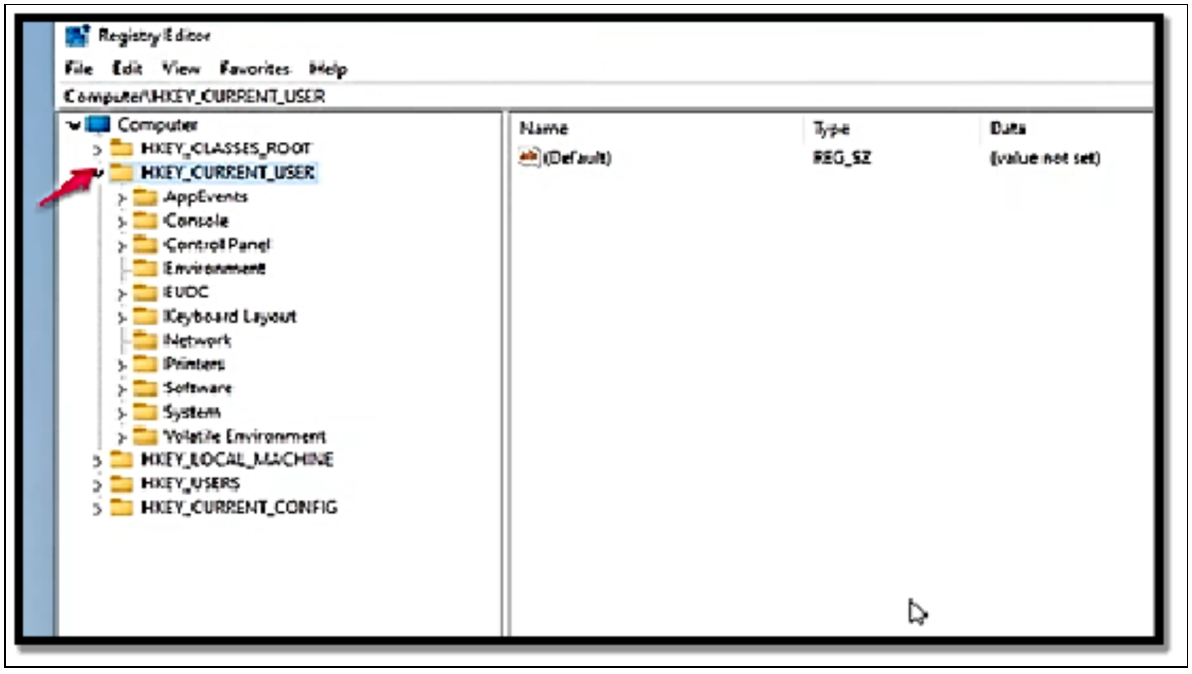
Here is a clever approach to using the Registry Editor to modify the Windows 11 Taskbar. In Windows 11, you may manually resize the Taskbar using the Registry Editor even though Microsoft doesn't officially support it. Use this workaround to adjust the size of the Taskbar icons on your Windows 11 computer.

**This is how:**

- Tap the **Window key** once and type “regedit” in the search box. You can then open **“Registry Editor” from the search result.**




- Once you have opened the **Registry Editor**, paste the below path into the address bar of the **Registry and tap Enter.**




Computer\HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Explorer\Advanced

- Then, right-click in the empty space while the advanced folder is chosen and then chooses New - DWORD (32-bit) Value.

- Configure the name of the DWORD Value as TaskbarSi and tap Enter to ensure the changes are saved. You can choose any option you would like to settle with.

## Ungroup Windows 11 Taskbar Icons

- Proceed and then download **ExplorerPatcher**. Then install the app and instantly, it will configure the **Taskbar icon alignment to the left**.
- Next, right-click on the Taskbar and choose **Properties to get the settings configured**.
- Under the **Taskbar section,** you can customize **Windows 11's new centered Taskbar** to your liking. You can then make changes to combine taskbar icons on the primary taskbar. You can also configure the Taskbar style to either Windows 10 or Windows.
- Ensure you choose **Restart File Explorer** at the lower left corner to add and see the changes.

## Group Policies and Power User Settings

A system tool called the Local Group Policy Editor (also known as gpedit. msc) lets you see and modify group policy settings on your computer. Advanced system settings that aren't accessible through the Control Panel or the default Settings program may require the usage of this utility. The Local Group Policy Editor on Windows, however, how can you access it?

## With the use of the Search Window

The search tool of Windows 11 ensures it becomes quite easy to locate apps, documents, and system configurations on your device. You can also make use of this option to locate the Local Group Policy Editor.

**To get this done, follow the steps below;**

- Choose the **magnifying icon on the taskbar** or make use of the W**in + S keyboard shortcut in order to have the search menu opened.**

- Type edit group policy or gpedit in the search box, and choose the first result that shows.

## With the use of the Run Command

One other easy way to open applications and programs on your Windows is via the use of the Run dialog box.

**Follow the steps below to get this done;**

- Tap **Win + R** in order to open the Run dialog box.
- Type gpedit. msc in the text box and then choose **OK** to have the Local Group Policy Editor opened.

## With the use of Command Prompt

You can utilize the built-in Windows command-line tools, Command Prompt and PowerShell, to access programs like the Local Group Policy Editor when you need to troubleshoot system faults or automate certain activities.

- Make use of the various options to open Command Prompt or PowerShell on Windows.
- In the console, type gpedit. msc and then touch **Enter** in order to open Local Group Policy Editor.

## From Control Panel

- Press **Win +R** in order to open the Run dialog box.
- Type the **Control Panel** in the text box and then tap **Enter.**
- Type edits group policy in the search box in the top-right corner of the **Control Panel window.**
- Beneath Windows Tools, choose **Edit group policy** in order to open the **Local Group Policy Editor.**

## Power User Settings

The current portable PC is jam-packed with hardware engineering marvels that have reduced the size of potent components to previously unheard-of levels. Similar efforts on the software side have been successful in extending the battery life of those designs. As a result, you may now use a Windows PC while traveling to complete tasks that are almost exact replicas of those you can complete at your desk. However, the battery life suffers as a result of all that processing power. Additionally, achieving the ideal balance relies on your goals. Sometimes you need your PC's full power, especially if you have to complete a task that requires a lot of resources quickly and you know you'll be back near AC power long before your battery is at risk of dying. In other situations, when there is a light workload and you know it will be a while before you can recharge your smartphone, you want to extend the battery's life as much as you can. Any action you take to increase a portable device's battery life helps you prevent having to stop working.

Hover your mouse pointer over the battery icon in the notification area to get an immediate idea of how much juice is left in the battery. You should see a message with the percentage of the battery life that is left after a few seconds. (On a portable PC with more than one battery, like the Surface Book series from Microsoft, each battery receives its own %, underneath an aggregate percentage that predicts the overall battery life remaining.) You also see an estimate from Windows of how long you will be able to operate on the remaining battery power if it has enough information to do so. This indicator indicates how long it will take the battery to fully charge when the laptop is connected to a charger. When you click

the battery symbol in Windows 10, a flyout menu with thorough information on the remaining power is displayed. The Quick Settings menu in Windows 11 may be accessed by clicking the battery symbol, which displays the battery's remaining percentage in the bottom left corner. To view a much more thorough report, access the Power & Battery tab in Settings by clicking that value.

- Toggle the scale of activity between 24 hours and one week using the menu options to the right of the Battery Levels header. The data returned show activity on a per-app basis for all times throughout the selected time frame when your device was using battery power.

In addition to that filter, you can utilize the Sort by option to change the presentation of per-app usage data from Overall Usage (the default) to show only active or background apps. The list can be sorted by name as well. Whatever way you cut it, it is some fairly potent diagnostic data. When used appropriately, it can assist you in determining which applications are primarily to blame for the PC's battery drain. Armed with this knowledge, you can decide not to use such apps when power conservation is a key priority or search for setting modifications in the programs at the top of the list (such as limiting background usage) to lessen their power requirements.

## Battery Saver and other power management options

The Power & Battery page also includes some more controls that enable you to alter the way in which Windows makes use of the battery while the current session is ongoing. From the Power & Battery page in configurations, you can make use of the Power Mode by selecting one of the three options; on systems running the original release of Windows 11, Balanced is the default; if you would like to shift the performance-battery ratio, choose Best performance or Best Power Efficiency. In Windows 10, this option was used as a slider control accessible from the taskbar. On PCs that run Windows 11, this choice has been moved to Settings. Furthermore, Windows

11 also provides a battery-saver feature whose settings can be found on the same page in Settings.

**When Battery Saver is turned on, Windows instantly modifies the following settings;**

- The Mail, People, and Calendar apps n longer sync instantly.
- Most applications that would always run normally in the background are now blocked from running. OneDrive for instance, sends a notification that it has temporarily stopped the syncing of local changes to the cloud. You can choose to override this action by simply choosing the Sync Anyway button.
- Display brightness is reduced by about 30 percent. Hardware manufacturers have the ability to alter this default setting, and you can also choose to override it with the use of the Lower Screen Brightness While In Battery Saver check box.
- All of the noncritical telemetry uploads are completely blocked.
- All noncritical downloads from Windows Update are also totally blocked.

While Battery Saver is enabled, Windows shows an overlay of a leaf on the battery icon in the taskbar, in Settings, and in the Battery flyout menu. By default, Windows 11 instantly switches on Battery Saver when the battery life falls below 20 percent. Make use of the Battery Saver Options on the Power & Battery page in Settings to alter that number to probably a percentage between 10 and 50; it is also advisable to choose Always to make Battery Saver mode the default or select Never to keep running at your preferred power mode until you reach the Low or Critical battery level.

**If you would like to modify those configurations, all you need to do is make use of the old-style Power Options in the Control Panel.**

- In Settings, type **Edit Power Plan in the search box**.
- Choose **the resulting option and then choose Change Advanced Power Settings**; lastly, expand the Battery heading to see the various choices to indicate the Low and Critical

battery levels. In those two configurations, you can choose to ask Windows to reveal a notification or get an action done. For instance, you can ask to see a notification when the battery level drops to 10 percent and have Windows instantly hibernate when it is at 5 percent.

If you're paying attention, you'll eventually develop a gut feeling about how long your battery will last and when you need to start actively seeking a power outlet. With Windows 11, you may create a battery report that provides a more accurate history of your battery. The report also enables you to see how battery capacity naturally degrades over time. Run the command powercfg /battery report in a Command Prompt or PowerShell window to create a battery report. A file named Battery-report.html is created in the current folder as a result of that activity; double-click that file to open the report in a browser window. The battery status of the current system is detailed in great detail in that report. The manufacturer's name and the battery's serial number are listed in the Installed Batteries section, for instance. It also shows how many power cycles the battery has seen and compares its current Full Charge Capacity to its Design Charge Capacity. The ratio between the two figures can be used to determine how much battery life your system has lost over time. Based on observed battery consumption measurements, Windows estimates your battery life for each recent session in the Battery Life Estimates section; an average value is displayed at the bottom of the list.

## Registry Tweak (for advanced users)

The first thing that is usually done by most people after they have gotten a new PC is to tune its configurations to their needs. One other way to make little alterations to a Windows PC is to make use of Registry tweaks. Nevertheless, there are quite more refined ways to make use of Registry tweak which is home to all of the basic and sensitive configurations of the OS. By tweaking the Registry editor, you cannot just improve the performance of your Windows 11 PC but you can also enable or disable some features and personalize various UI elements. In this section, you will learn about the various

Windows 11 Registry hacks and tweaks that you can use to get the very best out of your computer. On a computer running Windows 11 Home Single Language version 21H2, the above Windows 11 Registry hacks and modifications have been tried and tested to function. Since the OS's most delicate component is the Registry Editor, taking matters into your own hands could have unintended consequences. As a result, it is essential that you carefully follow the Windows Registry tips and create a manual backup of the Registry. As a precaution, you should also make a system restore point.

## Revert to Windows 10-Style Context Menu

Windows 11 conceals a number of frequently used options under Show more options, in contrast to Windows 10, which had a context menu that was less aesthetically beautiful but simpler. If you agree with me, there is a small registry patch that can restore the previous context menu, which I really like. You'll be able to remove the Windows 11 context menu if you make the changes to the Registry as explained below.

- Open the **Registry Editor** and locate the following path. As an alternative, you can also choose to paste the following address into the address bar of the Registry Editor windows and touch the **Enter key** so as to get to that very location.
  HKEY_CURRENT_USER\Software\Classes\CLSID
- Right-click on CLSID and choose **New > key**
- Whenever the new key has been created, change its name then right-click on the **newly created key**, and then choose **New > Key**.
- Give this new entry the name InprocServer32. In the right-hand pane, double-click the **(Default) entry**. Before clicking the **OK button,** be sure you haven't changed anything in the Edit String window. If you skip this step, the trick won't work.

## Add an App to the Windows 11 Context Menu

This option helps you to make the apps you use often present in the context menu of Windows 11. This is another lovely tweak that you

can use in the addition of an app shortcut to the desktop context menu.

- Open the **Registry Editor** and locate; HKEY_CLASSES_ROOT\Directory\Background\Shell
- Right-click on Shell and then click on **New > Key.**
- Next, you can assign to the newly-created entry a name. It is worth noting that there is a need for you to give a name that corresponds with the name of the app. For instance, if there is a need for you to add a Chrome browser shortcut to the context menu, give it the name “Chrome”.
- Right-click on the Notepad key you have just designed and once more click on **New > Key.**
- When the new key is designed under Notepad, change its name to Command.
- After that, paste the complete path of the app you wish to add in the Value data box as shown below by double-clicking on the (Default) key in the right-hand pane. Follow this thorough tutorial to find out the 7 different ways you can replicate a file's full path in Windows. Anyway, open notepad.exe by navigating to C: WindowsSysWOW64. Press Shift + Right-Click to select "notepad.exe" and then select the Copy as Path option from the context menu.
- Lastly, select **OK**. Then right-click on the desktop, and choose **Show more options > Notepad to open the app right from the context menu.**

## Adjust the Size of Taskbar Icons to Your Preference

**If there is a need for you to reduce or enlarge the size of the icons displayed on the Windows 11 Taskbar, this tweak is your best option.**

- Go to the following path in the **Registry Editor**. HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Explorer\Advanced.

- Right-click on Advanced and choose **New > DWORD (32-bit) value.**
- When the new DWORD file has been created, give it the name Taskbar Si. You can then right-click on this file and then choose **Modify.**
- It's then time for you to modify the Value data for this DWORD entry to 0 (small), 1 (medium or default size), or 2 (large).
- Since the value of the data has been changed, you can choose to either refresh the desktop or restart your PC in order to see the effect.

## Disable the Windows 11 Lock Screen

The lock screen feature was brought in with the Windows 8 in the year 2012 and has been in use since then. Its job is to act as an extra layer of security and display a background image along with various icons like battery, messages, network, etc. Most people are a fan of it and some others do not like it. If you belong to the latter group, you don't have to put up with it as there is a way in which you can disable it with a neat Registry tweak. When it is disabled, you can get directly to the login screen when you happen to restart your PC.

**Take the steps below to disable the Windows 11 lock screen;**

- Open the Registry Editor and locate the following; HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Microsoft\Windows
- Right-click on Windows key and select **New > Key**.
- Assign Personalization as the name of this new key.
- Once done, you can then right-click on Personalization and choose **New > DWORD (32-bit) Value.**
- When the DWORD file has been created, change its name to NOLockScreen.
- Right-click on NoLockScreen and choose the Modify options. As an alternative, you can choose to click twice on the file to have it modified.
- Type 1 in the Value data field, if you would like to disable the Windows lock screen and choose the **OK button.**

## Change the Icon Spacing on the Desktop

Windows 11 is no doubt more appealing visually than Windows 10. If there is a need for you to enhance the cleanliness of your desktop, you can attempt to increase the space that is between the icons. If you are one who has lots of icons on the desktop, you can attempt to decrease the amount of space between icons in order to ensure your desktop is much cleaner. If you would like to either **increase or reduce the icon spacing on your desktop, the following registry tweak will help you out with that;**

- Open the **Registry Editor**, and locate the following location.
  HKEY_CURRENT_USER\Control Panel\Desktop\WindowMetrics
- Select the **WindowMetrics key in order to locate 2 entries with the name IconSpacing and IconVerticalSpacing located in the right-hand pane.** While IconSpacing is in charge of horizontal spacing, the value of IconVertical Spacing helps with the control of the spacing between desktop icons in Windows 11.
- Right-click on **IconSpacing and choose the Modify option**. By default, both the vertical and horizontal spacing value for desktop icons is -1125. You can choose to either decrease or increase this value. Also, you can alter the vertical spacing between icons by modifying the value for IconVerticalSpacing.

## Move the Taskbar to Left, Right, Top, or Bottom

I always choose to keep the Taskbar at the top of my computer's display for some reason. I was, however, forced to live with the taskbar on the bottom position after receiving a new PC that came pre-installed with Windows 11. While Windows 11 allows you to center and move the taskbar program icons, you cannot move the entire taskbar to the right, left, or top of the screen. Fortunately, I discovered a registry trick that enables you to move the taskbar to any of the four screen boundaries.

- Open the **Registry Editor** and move to the location mentioned below. You can also choose to paste the path in the Registry

Editor Address bar and then tap the **Enter Key** in order to move straight to the StuckRects3 entry.
HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Explorer\StuckRects3

- Click twice on the **Settings binary file in the right-hand pane**. A new window will then be opened displaying its properties.
- You will then be able to view 7 entries beneath the value data field. The 5th value in the 00000008 rows is configured to 03 by default which is the value from the lower position of the taskbar. Beneath is the list of codes for the left, right, top, and bottom positions.

- Left
- Top
- Right
- Bottom

- Click **twice on 03 in the 00000008** rows and change its value with any of the values mentioned above based on what you prefer to have. For example, insert 01 if you would like to move the Windows 11 taskbar to the top position.
- Once you have completed the modifications, choose the **OK button**. Close the **Registry Editor.**
- Once the above has been done, you then need to give one last touch by having to restart **Windows Explorer.** This is needed for the changes to be applied. There are various methods to help restart Windows.
- Tap **the Win +X or Alt + Ctrl + Delete buttons** at the same time and choose **Task Manager.**
- Choose **Windows Explorer** from the list of apps available and processes and then choose the **Restart button**. You can also gain access to the Restart option by right-clicking Windows Explorer.
- As an alternative, you can also choose to kill the Explorer.exe and start it again with the use of the Command Prompt.
- Insert the following command in the Command Prompt window and then tap the Enter key. "taskkill /f /im explorer.exe"

- The execution of the command will kill Explorer. Exe. Then type the command line mentioned below to commence it. Start explorer. exe

## Disable Bing in the Start Menu

Windows 11 is no exception to Microsoft's practice of integrating its own search engine, Bing, inside the Windows Start Menu. You'll also see search suggestions from Bing whenever you look for a file, image, or document. There is no way to turn off Bing in the Start Menu from Settings if you don't like that. If, however, you choose the Registry Editor Trick described below, you are not helpless.

- Navigate to the following location in the **Registry Editor.** HKEY_CURRENT_USER\SOFTWARE\Policies\Microsoft\Windows
- Right-click on the Windows key and choose **New > Key**.
- Anytime the new key has been created, give it a new name “Explorer”.
- Once the above has been done, right-click on Explorer and choose **New > DWORD (32-bit) Value.**
- Getting this done will then lead to the creation of another DWPRD entry in the right-hand pane. Then assign “DisableSearchBoxSuggestions" and alter the Value Data from 0 to 1.
- Lastly, choose the **OK button** in order to save the changes. The Bing search feature will then be disabled from the Start Menu when you eventually restart your PC.

## Restore Windows Photo Viewer

Microsoft introduced the Photos app with the Windows 10 update, taking the role of the Photo Viewer program as the default app to open image files. The Photo Viewer software is still part of the OS, which is a plus, but it's still deactivated by default. With the following registry trick, you can restore the previous program if you still want to use it.

- Open the **Notepad app**. To get this done, choose the Windows icon in the taskbar, insert Notepad in the search box, and then select **Notepad.**
- Once done, copy the following snippet and then paste it to the file of the Notepad.

```
Windows Registry Editor Version 5.00
[HKEY_CURRENT_USER\SOFTWARE\Classes\.bmp]
@="PhotoViewer.FileAssoc.Tiff"
[HKEY_CURRENT_USER\SOFTWARE\Classes\.gif]
@="PhotoViewer.FileAssoc.Tiff"
[HKEY_CURRENT_USER\SOFTWARE\Classes\.ico]
@="PhotoViewer.FileAssoc.Tiff"
[HKEY_CURRENT_USER\SOFTWARE\Classes\.jpeg]
@="PhotoViewer.FileAssoc.Tiff"
[HKEY_CURRENT_USER\SOFTWARE\Classes\.jpg]
@="PhotoViewer.FileAssoc.Tiff"
[HKEY_CURRENT_USER\SOFTWARE\Classes\.png]
@="PhotoViewer.FileAssoc.Tiff"
[HKEY_CURRENT_USER\SOFTWARE\Microsoft\Windows\Current
Version\Explorer\FileExts\.gif\OpenWithProgids]
"PhotoViewer.FileAssoc.Tiff"=hex(0):
[HKEY_CURRENT_USER\SOFTWARE\Microsoft\Windows\Current
Version\Explorer\FileExts\.ico\OpenWithProgids]
"PhotoViewer.FileAssoc.Tiff"=hex(0):
[HKEY_CURRENT_USER\SOFTWARE\Microsoft\Windows\Current
Version\Explorer\FileExts\.jpeg\OpenWithProgids]
"PhotoViewer.FileAssoc.Tiff"=hex(0):
[HKEY_CURRENT_USER\SOFTWARE\Microsoft\Windows\Current
Version\Explorer\FileExts\.bmp\OpenWithProgids]
"PhotoViewer.FileAssoc.Tiff"=hex(0):
[HKEY_CURRENT_USER\SOFTWARE\Microsoft\Windows\Current
Version\Explorer\FileExts\.jpg\OpenWithProgids]
"PhotoViewer.FileAssoc.Tiff"=hex(0):
[HKEY_CURRENT_USER\SOFTWARE\Microsoft\Windows\Current
Version\Explorer\FileExts\.png\OpenWithProgids]
```

- Once the above has been done, choose the **File tab** and choose the **Save as option.**

- Add restore_photo_viewer_win_11 as the name of this file and then choose the **Save button.**
- Whenever restore_photo_viewer_win_11.txt has been saved, modify the extension of the file from .yxy to. reg.
- You can then click twice on restore_photo_viewer_win_11.reg and choose Yes anytime you are prompted to make a choice. The script will then tweak the Registry Editor in order to make it enable the Photo Viewer app.
- Lastly, right-click on an image file, chooses the Open with option, and chooses Photo Viewer from the list of applications available.

## Open the Last Opened Window in Any App

Hovering the mouse pointer over the program icon will display thumbnails for all open windows if you have several windows open in that app. The application that has numerous windows open can switch to the most recent window by using a clever registry trick.

**Try the below-listed approach if you desire this feature on your Windows 11 computer.**

- Navigate to the following location in the **Registry Editor** HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Explorer\Advanced
- Perform a right-click while the Advanced key is chosen and then select **New > DWORD (32-bit) Value.**
- Whenever a new DWORD entry is created, modify the name to **“LastActiveClick”.**
- Once done, click twice on **LastActiveClick** and then change 0 for 1 in the Value Data field.
- Lastly, choose the **OK button** in order to save the changes and restart your PC.

## Windows Subsystem for Linux (WSL) Configuration

A feature of Windows called Windows Subsystem for Linux (WSL) enables programmers to run a Linux environment without the

requirement for a separate virtual machine or dual booting. WSL comes in two different iterations: WSL 1 and WSL 2. WSL 1 was originally made available on August 2, 2016, and by putting Linux system calls on the Windows kernel, it serves as a compatibility layer for running Linux binary executables (in ELF format). It is compatible with Windows 10, Windows 10 LTSB/LTSC, Windows 11, and Windows Servers 2016, 2019, and 2022. WSL 2, which introduced significant enhancements including a genuine Linux kernel through a selection of Hyper-V features, was unveiled in May 2019. In contrast to WSL 1, WSL 2 operates inside a managed virtual machine that uses the entire Linux kernel. Because not all syscalls were implemented in WSL 1, WSL 2 is compatible with more Linux binaries than WSL 1. WSL 2 has been accessible to users of Windows 10 since June 2019 through the Windows Insider program, including the Home edition. Not every Windows 10 user has access to WSL by default. It can be set up manually or by signing up for the Windows Insider program.

**If you would like to install the Windows Subsystem for Linux, follow the steps below;**

- Open an elevated Command Prompt window.
- Insert wsl–install. If this command doesn't pull through this means that you already have WSL installed on your system.
- Insert the following command in order to see a list of the distributions that are available at the moment; wsl - - list - - online
- Install a Linux distribution by inserting this command; wsl - - install - d
- When there is a prompt, add a username and password to complete the process. The username and password that you insert will be used by WSL alone and it does need to be a match with your Windows credentials.

## Accessing the Linux files from the Windows Subsystem for Linux

When you have installed the WSL, the Linux files are saved in a different place from Windows files. Even so, the two operating systems' file systems will be accessible from one to the other. If there is a need for you to see where Linux files are saved, simply insert the following command in the Linux terminal; explorer.exe. When you are inserting this command, it is quite mandatory for you to include more periods at the end due to the fact that it opens Explorer to the current directory. If there is a need for you to gain access to your C: drive from the Linux terminal, insert this command: cd/mnt/c.

## Launching applications from the Windows Subsystem for Linux

When you make use of WSL in the installation of a Linux distribution, the said distribution will open to the terminal environment. As such, there will be a need for you to launch the application from the command line as against the use of a point-and-click GUI environment.

**There are basically two steps involved in launching an application;**

- Ensure the application is executable if this has not been done already by typing this command; chmod + x.
- Open the application by simply typing the command; /

## Major differences between the Windows and Linux versions of the Windows Subsystem for Linux

The primary distinction is the lack of a GUI environment. You would be given access to the complete GUI environment, for instance, if you downloaded Ubuntu and installed it on a virtual machine. On the other hand, installing Ubuntu through WSL just offers you access to the terminal. Although a GUI environment can be manually installed, WSL does not use one by default.

## What is the performance difference between the Windows and Linux versions of the Windows Subsystem for Linux?

Views on WSL's performance are divided. WSL will never be objectively as quick as a Linux installation due to the overhead brought on by the Windows operating system. Even so, WSL's performance is typically very good and, in certain circumstances, even approaches that of native Linux.

## What are the various limitations of the Windows Subsystem for Linux?

Microsoft lists a number of differences between native Linux and WSL. Although the majority of these variations are not actual constraints, one is. If there are no open file handles, WSL's VM will shut down on its own. Therefore, unless it is constantly in use, WSL is not suited for use as a production server.

## What are some of the best practices for making use of the Windows Subsystem for Linux?

Microsoft advises against working with different operating systems unless you have a compelling reason to. The Linux file system should be accessed using Linux, and the Windows file system should be accessed using Windows.

## Activity

1. Customize your taskbar and start menu.
2. Configure your power user settings.
3. What do you understand about the Windows Subsystem for Linux?

# CHAPTER 12
# MEDIA AND ENTERTAINMENT

People frequently listen to music, particularly when writing lessons for Digital citizens. While writing a novel, many people have listened to music. You could think of music as a diversion, but for some people, it's a way to start writing productively and enter a state of creativity. Sometimes listening to music helps people improve their already positive mood and enjoy their day even more. Life has always included entertainment in some capacity. When life looks hopeless because of hectic schedules or intolerable duties, it gives it air. You can maintain both your mental and emotional wellness by engaging in enjoyable activities. The importance of entertainment in our lives has never changed; it will make us happier. You might even become closer to your friends and family as a result of some of these activities. As a result, entertainment has several advantages.

You can use entertainment to take your mind off the things that are causing you worry. When you engage in enjoyable or enjoyable activities, endorphins are released by your body. This substance has a reputation for reducing pain and tension. Therefore, entertainment might contribute to your level of happiness. You have several options for how to pass the time. If you have a hobby, it gives you the chance to express your creativity while having fun. Entertaining hobbies might serve as a distraction if you need a break from a typical or hectic schedule. You can watch your preferred TV shows, movies, sports events, and other programming on social media, online video platforms, and other venues. Even taking part in sports is an option. Thus, you can avoid boredom or stress by engaging in amusing activities or programs. They can make you happier and make life more enjoyable. If you take one or two quick breaks, you'll have more energy to work because a relaxed mind allows for an active body. During these intervals, you might engage in fun activities to give yourself a boost of energy before returning to your current work. In this chapter, you will learn about the various ways in

which you can get lots of entertainment when making use of your Windows 11 PC.

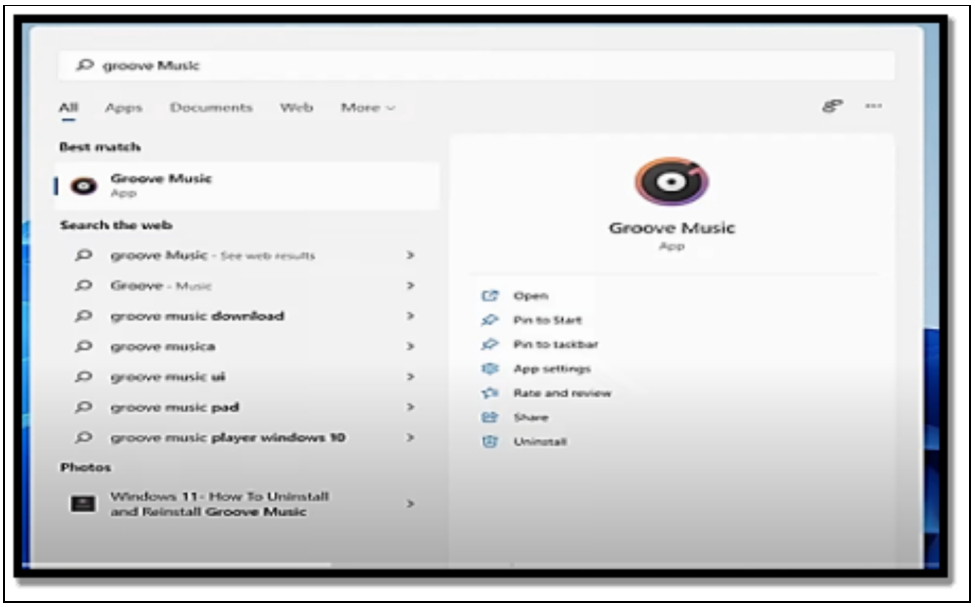
## Playing Music and Videos

It doesn't matter if you are an audiophile or just a user of the computer on an average level, there is sure a need for you to listen to music. If you are quite old-fashioned, there may still be a need for you to continue to listen to music locally, on your PC, or on an audio CD. If this is the case, then you should employ the use of Groove Music and Windows Media Play on your computer. Both of them are usually included in Windows 11. If you are also a fan of streaming online, Spotify can also be the way to go. It doesn't matter the type of music you listen to, in this chapter, you will learn how to work with all of the music-related applications that you can find in Windows 11 which are Groove Music, Windows Media Player, and Spotify. You will also learn about the video territory and you will learn how to make your vacation into a lovely and unique homemade video creation.

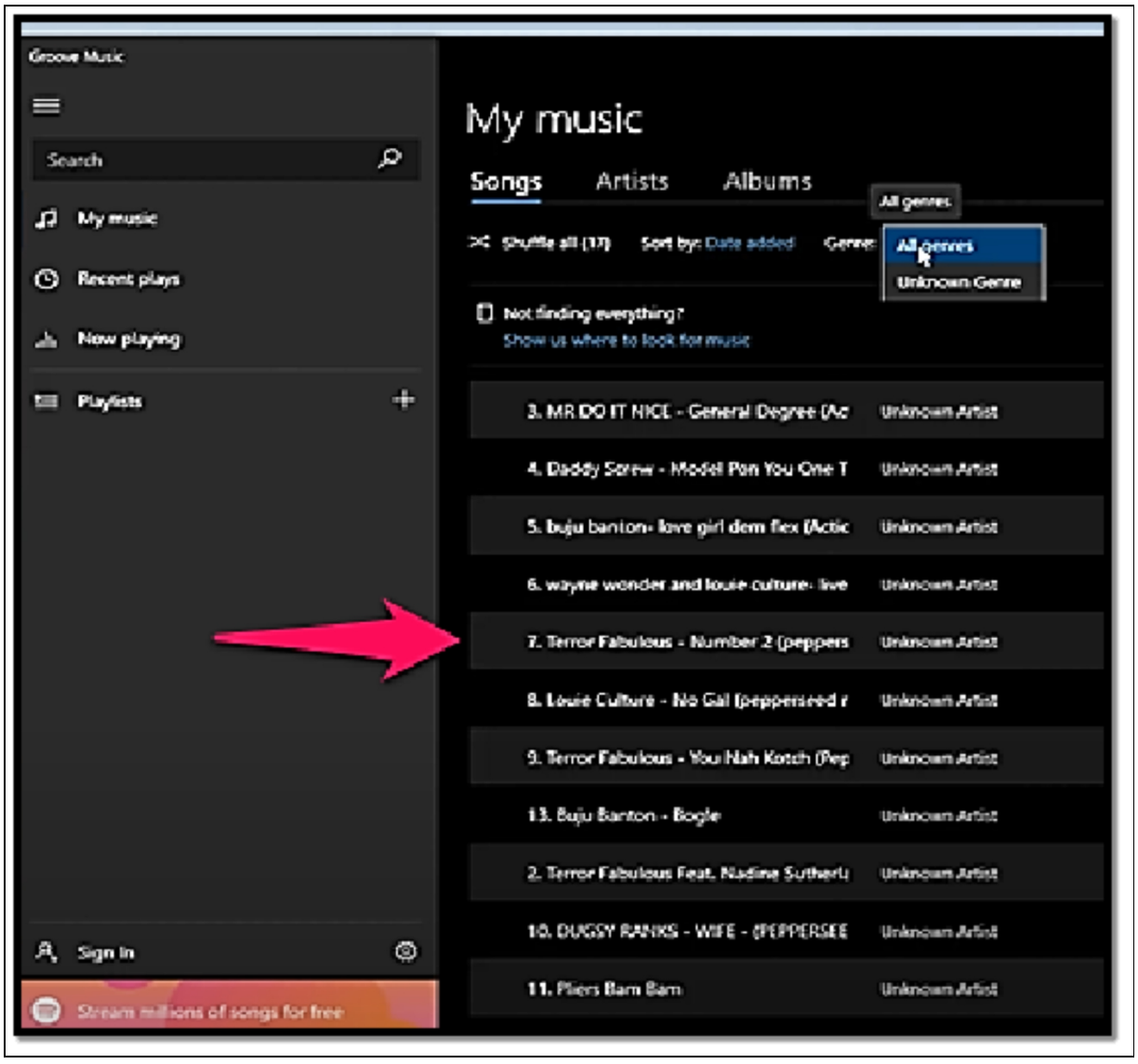
## Groove Music

Windows 11 has the same Groove Music app from the previous Windows 10. The latest version of this application has been designed to play just the music locally saved on your computer although it also helps with the promotion of Spotify. By default, Groove Music locates MP3 and any other audio files in your Music folder. Once it locates one, it can then play them for you. If you **happen to be a senior user but still have lots of music collections on your computer, you can listen to that music by following the steps below;**

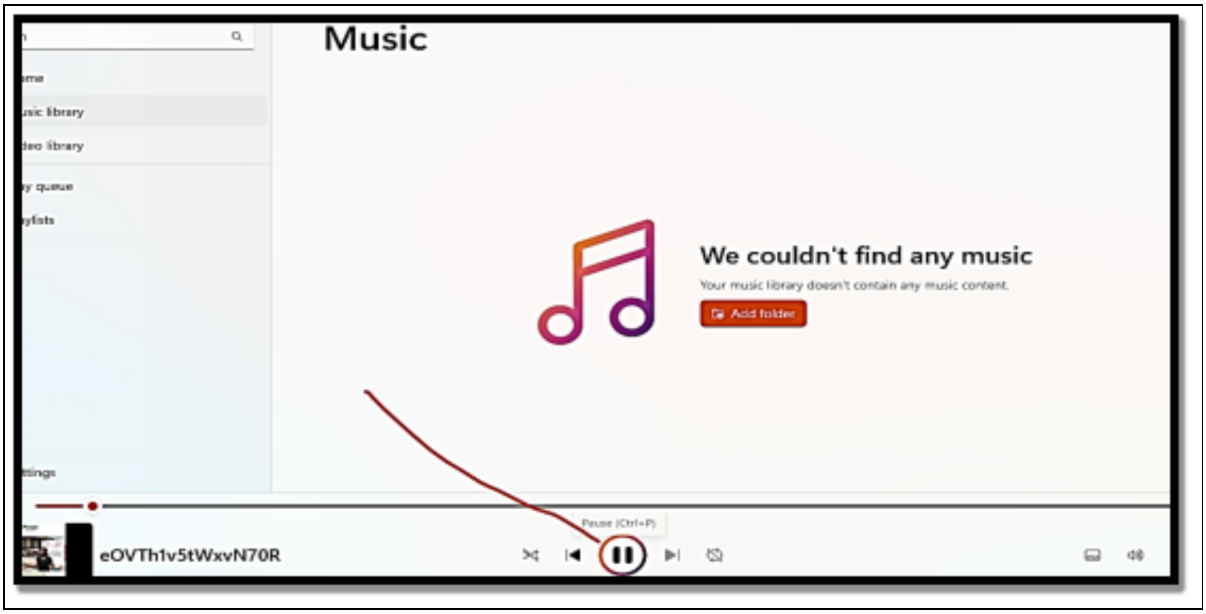
- Ensure that your music collection is saved in the music folder of the user.
- Choose or touch **the Start icon**, **all apps, and then Groove Music**. If this happens to be the first time you are starting the application, Groove Music will spend some time configuring things and scanning your Music folder.




- Choose or touch **songs**. You will then be shown a list of all of the songs that have been saved in your Music folder.




- Locate the song you would like to play and click **twice on it.** The song will then begin to play and at the lower part of the screen, you will be shown the music controls.
- Play or pause **the track**, and move to the next track or the previous one in your list, you can also choose to jump to any song of your choice on the list.




- If you would like to have a more focused view, choose or touch the now-playing icon on the left side which resembles a sound equalizer.

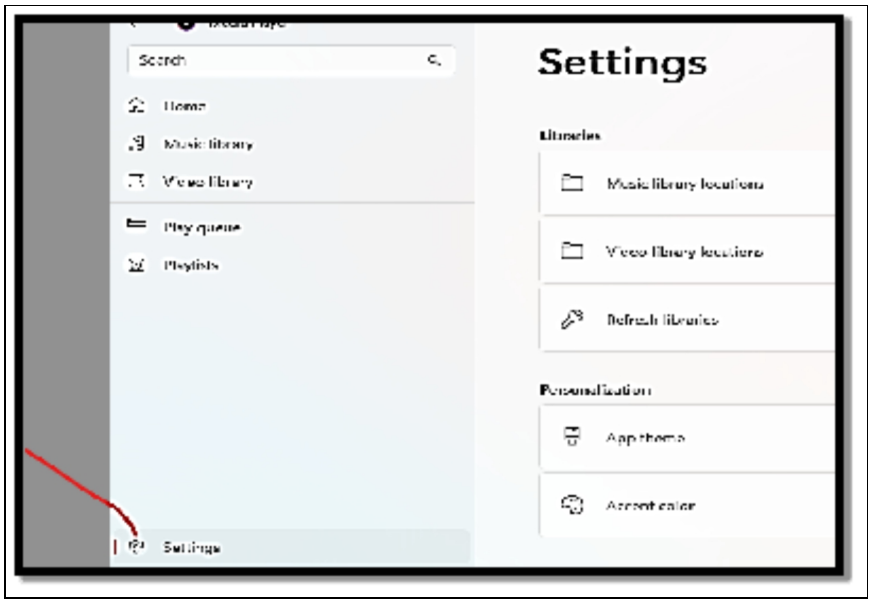
The following audio file types can be played by Groove Music:.mp3,.flac,.aac,.m4a,.wav,.wma,.ac3,.3gp,.3g2,.amr,.mka,.ogg and opus. If you double-click or double-tap a music file with one of these files extensions in File Explorer, it automatically launches Groove Music so you may listen to it.

## Selecting where Groove Music searches for music

As stated, Groove Music actively focuses on the Music folder linked with your user account.

**If you would like to find music in another folder, you must instruct it to do so;**

- Choose or touch the **Start icon**, **all apps, and then Groove Music**. The Groove Music app will then be opened.
- On the left side of the pane, choose or **touch the gear icon (settings).** The Groove Music settings screen will then be displayed.




- Beneath **Music on This PC**, choose or touch the **Choose Where We Look for Music link**. A list with the list of the folders Groove Music monitors will be shown.
- Choose or touch **+**, choose the folder you would like to make use of and then choose or touch **Add This Folder to Music.** The folder will then be added to the list.

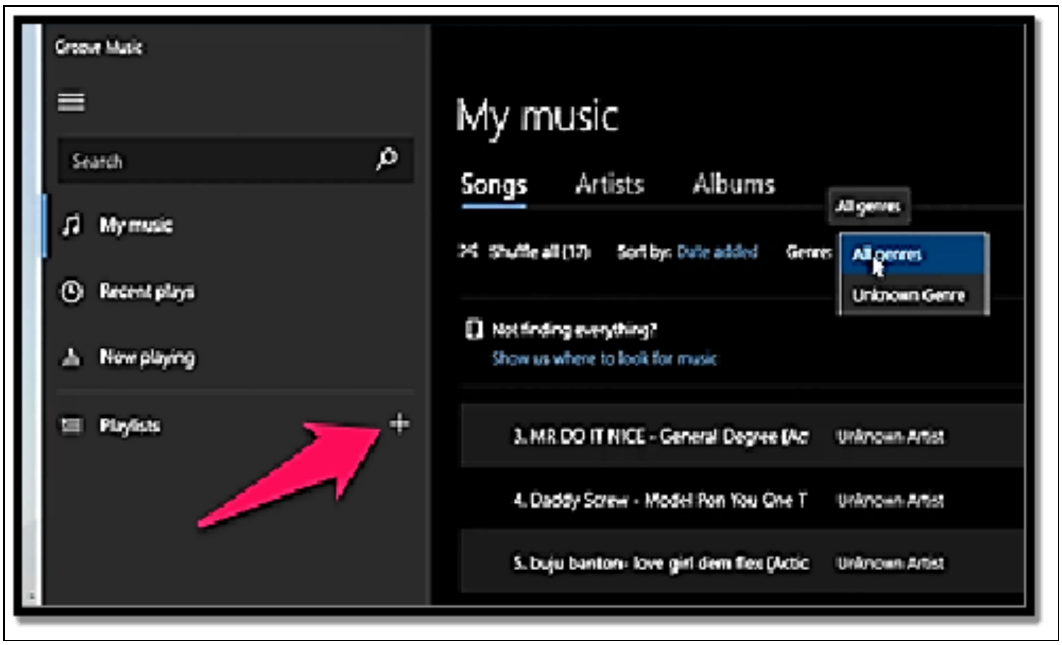
- Once you are done including folders to Groove Music, choose or touch **Done**.
- Choose or touch **two musical note icons (my music)** on the left side of the pane in order to have a view of the collection that has been updated. If you happen to have a large music collection, be patient while Groove Music scans the collection.

## Creating playlists in Groove Music

The Groove app you must have noticed is simply a basic app and doesn't do so much except for the music you have saved on your Windows 11 computer. If you would like to keep things well arranged, you can make use of it also in the creation of your own playlist.

**Follow the steps below to get this done;**

- Open the **Groove Music app**.
- On the left side of the pane, select or touch **+ (create a new playlist)**



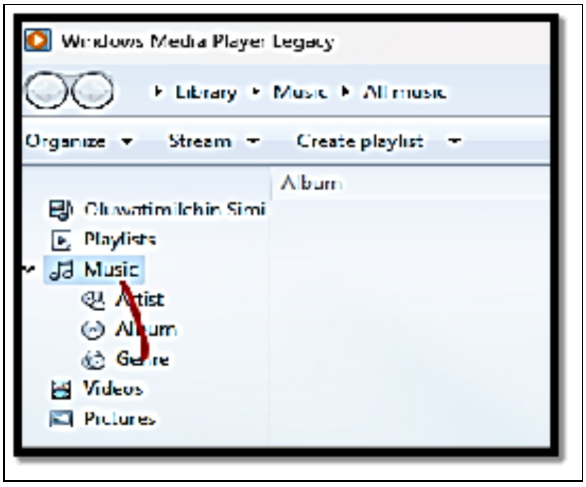

- Insert a name for your playlist and then select or touch **Create Playlist**. The playlist will then be displayed but it will be empty. You will then have a need to add songs to it.
- Select or touch the **Go to Albums beneath Add Songs from My Collection**. All of the albums located by Groove Music will then be displayed.
- Right-click or touch and hold down on the **specific album you would like to include.**
- Choose **Add to**, and then the name of your playlist. Once done, you will immediately see a notification at the top right showing the number of songs that were just included in the playlist.

# Windows Media Player

Windows Media Player has survived in Windows 11 despite the fact that few people are aware of it and even fewer actually use it. It still performs the same functions as it did in Windows 8 and Windows 10 and hasn't changed in many years: It may be used as an image viewer and plays music and videos. Windows Media Player automatically searches your local Pictures, Music, and Videos folders as well as those on your OneDrive for material when it starts up. You can interact with the content if it finds something in one of the various formats it can play or view.

**Below are ways by which you can make use of the Windows Media Player to play music and videos;**

- Choose or touch **the search icon on the taskbar and then insert the word media player.**
- Select or touch the **Windows Media Play search result.** A welcome message will be shown asking you to make your choice of settings if this is the first time you are opening the application.
- If you happen to see the welcome page, all you have to do is choose the **Recommended Settings** and select or touch **Finish**. The Windows Media Player application will then be shown. The app will take some minutes to scan your **Music, Videos, and Pictures folders both on your OneDrive and locally.**



- Select **Music**, on the left side of the pane, and then you will choose a **song you would like to play**. The song will start playing instantly, and you can also choose to make use of the controls at the lower part of the screen, play, skip to the next song, and more.
- Choose **Videos** and then choose the **specific video you would like to see**. The video will then open in a special window with controls that are quite useful being displayed at the bottom.

- If you would like to close Windows Media Player, all you have to do is choose the **X icon in the top right corner.**

## Getting Music from Your Old CDs

Do you have a sizable CD-based music library? Do you adore the music of Bob Dylan, the Beatles, Pink Floyd, and Rush? The issue is that CDs degrade with time and stop working after a number of

years. One option is to rip the songs from CDs and put them on your PC if you don't want to lose them. Even your music on OneDrive or another cloud storage service can benefit from a backup. Ripping is the technique of copying music from a CD to a computer in a format like mp3. Once a CD has been ripped, you can take the mp3 files that are produced, move them wherever you like, and listen to them without a CD. By using the CD less frequently and playing the music you've ripped from it in its place, you can extend the life of the disc in this way.

**If you would like to rip music from a CD you own and love the music on it, plug it into the DVD/Blu-Ray drive of your desktop PC, and then follow the steps below;**

- Choose **the search icon** on the taskbar and then insert the name media player.
- Choose the **Windows Media Player search result**.
- Wait a few seconds for Windows Media Player in order to read the disk, and then choose **the name of the left pane beneath other Media**. Windows Media will then display the tracks and the album cover for your CD
- If you would like to configure the process of ripping, choose **Rip Settings**.

- To configure the format for music files, select **Format**, and then select the **format you would like to make use of.**

- In the same Rip Settings menu, select **Audio Quality** and then choose **a high value like 320 Kbps.**

- Choose **Rip CD**. Windows Media Player will then show the ripping status for each track on your CD. In less than no time,

all your songs will be ripped off the CD and then saved on your PC

- When the ripping process is done, choose **X in order to close Windows Media Player**, and then eject your **CD**. All of your songs will be in the Music folder; a folder that has been named after the artist whose songs you have ripped.

## Spotify

Microsoft introduced Groove Music as a music streaming service to compete with services like Spotify, Tidal, and Apple Music when Windows 10 was first released. Unfortunately, Groove Music has lost the war and has been reduced to simple software that only plays local music. But Microsoft and Spotify have a partnership, and Microsoft constantly advertises this music service, including on the Windows 11 Start menu.

**You may directly join Spotify from Windows 11 if you wish to stream music for free online:**

- Choose the **Start icon and then the Spotify shortcut**. If you happen to see a progress bar beneath the Spotify shortcut, this means Windows 11 is downloading the application from the Microsoft Store.
- When the Spotify application opens, choose **Sign Up**.
- Insert your email address, your preferred password and your name then **choose Continue.**
- Fill in your date of birth and your gender and then choose **Join Spotify**. The home screen for Spotify will then be shown.
- Choose one of the featured charts and then choose **the play icon**. Music will then begin to play and you will be able to see the track controls at the lower part of the screen. This is also almost the same as the ones from Groove Music and Windows Media Player.

Starting with Spotify doesn't cost you anything. You are free to enjoy songs for as long as you like. The fact that you have to listen to advertisements after every few songs and the poor audio quality of the music streaming are the two main drawbacks of the free plan.

Ads are removed and the audio quality is increased to the highest level possible with an individual plan ($9.99 per month), nonetheless. Plans are also available for families of up to six people, couples, and students for just $4.99 a month.

## Using the Photo App

Photo is the standard application for managing and organizing your photos and videos in Windows 11. The program has already undergone a redesign to improve its visuals for the newest operating system release. Microsoft has however just launched another update that improves the interface even more and makes it simpler to see, locate, arrange, and edit all of your media files, whether they are kept locally on your computer or on the cloud. The only catch is that Microsoft is abandoning the video editing features starting with this edition in favor of its Clipchamp tool. However, as the organization gets rid of old services, it also adds new ones, like iCloud and OneDrive integration so that users of the iPhone and iPad can manage their photos from a single interface. The new Photos app has a new UI that incorporates the new design cues found in Windows 11, including mica material, rounded edges, a search bar that is centered, and a navigation pane on the left with the ability to collapse or extend the menu. The navigation pane was in the top position in the previous iteration. Now that the pane is on the left, you can easily navigate your media files that are saved locally on the computer, on OneDrive, or in iCloud.

## Search

At the top, the Photos application has its search function that seems and works much the same as the search features that can be found in the Microsoft app. Nevertheless, this feature does not look like it offers support to search previews as you have to touch the **Enter key to get the result.** Close to the search box, there are also two options which include Import; this is to Import images from external devices and also the option to gain access to the Photos settings.

## Toolbar

The photos command bar has various options to sort by criteria such as recently added, date taken, date modified, and name. You can also choose to filter your media by photos and videos, modify the preview size, and also choose settings.

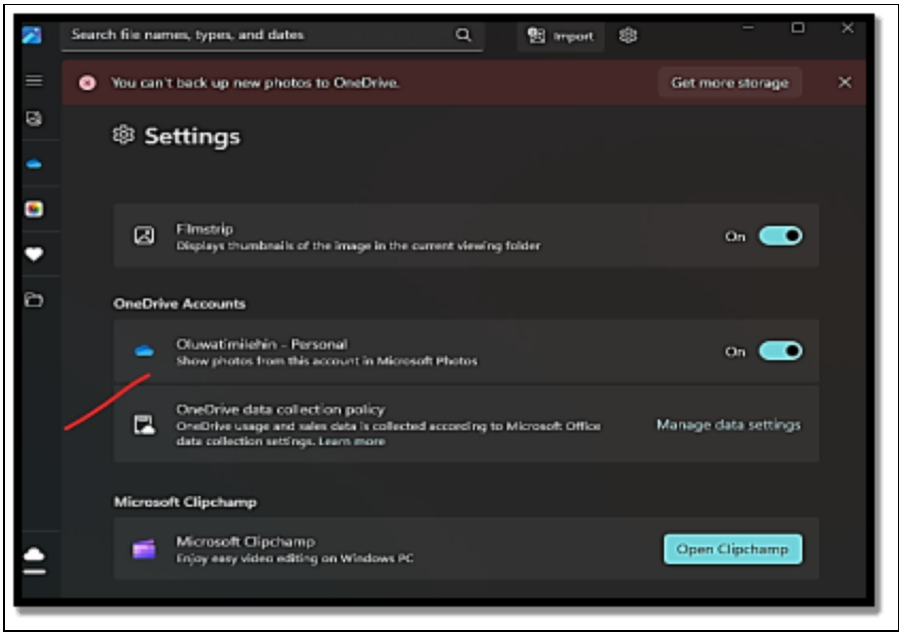
## Pictures

The application no longer has a timeline scroller located on the right side in this new version. Rather, as you navigate down through your library, in the top-left, you will be able to see a sub-heading with the time range of the images you are looking at. By default, the images include various characteristics such as icons that show some very basic information about the file. For instance, you will see a badge icon in the top-left corner of the preview showing if the file is a video format or if the item is saved in a cloud service like OneDrive or iCloud. You can also always right-click an image to gain access to the various actions through the context menu, like open, print, copy path, share, move, rename, and delete. As an alternative, the command bar will display more actions as you choose the file, like undoing the selection, uploading the file to OneDrive, moving, sharing, and deleting.

## Hide OneDrive

**If you would like to conceal your OneDrive pictures in the Photos app, follow the steps below;**

- Open **Photos**.
- Choose **Settings in the top-right corner**.
- Beneath the **OneDrive Accounts**, switch off the **OneDrive toggle button** in order to put an end to the display of cloud pictures.




Once you have completed the steps above, you will only be able to see the images that have been saved locally on your computer.

## Show OneDrive

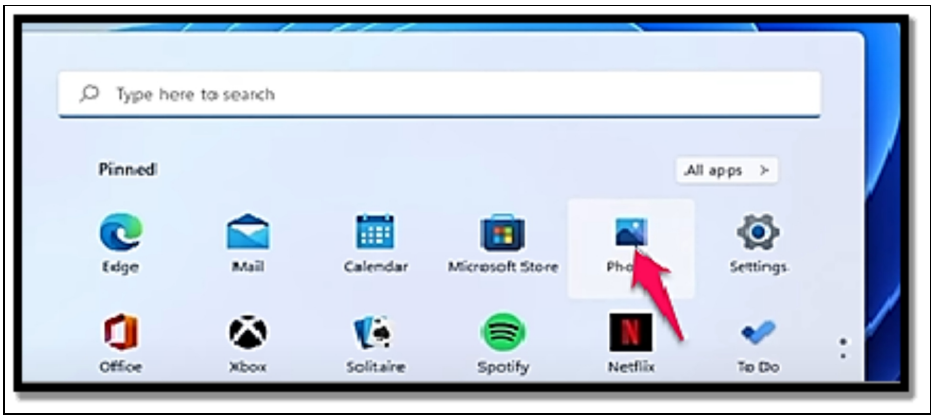
**If you would like to display OneDrive pictures in the Photos app, follow the steps below;**

- Open **Photos**.
- Choose the **Settings button located in the top-right corner.**
- Beneath the OneDrive Accounts, switch on the **OneDrive toggle button**.

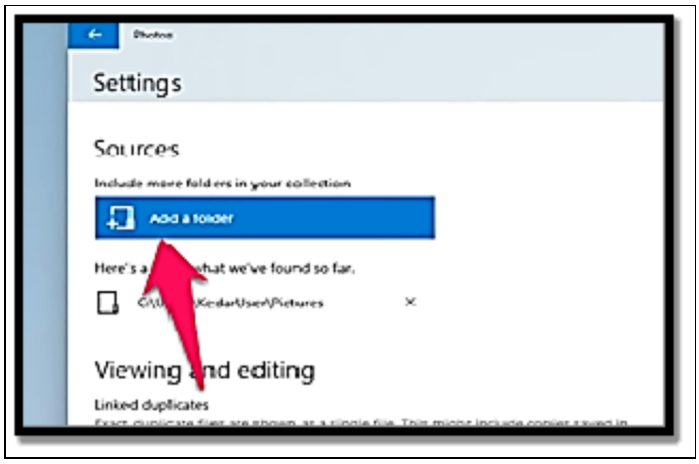
## Add a folder

**If you would like to include a folder with pictures to photos, follow the steps below;**

- Open **Photos**.




- Choose **Folders**.
- Choose the **Add a Folder button**.




- Choose the **specific folder.**
- Choose the **Select Folder button**.

Once the above steps have been completed, the folder will be made available beneath the Folder section from the navigation pane.

## Remove a folder

**If you would like to take off a folder location from Photos, make use of the following steps;**

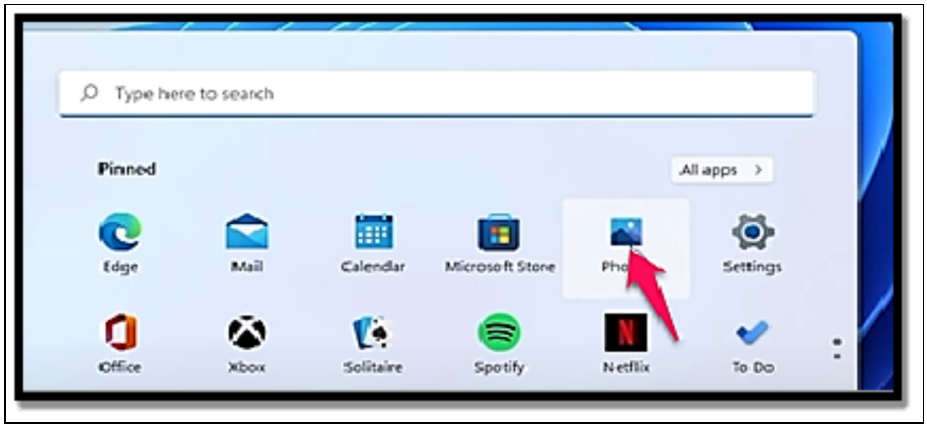
- Open **Photos.**
- Choose **Folders**.
- Right-click the folder and choose the **Remove folder option**.

# How to Import Images from External Sources in the Photos App

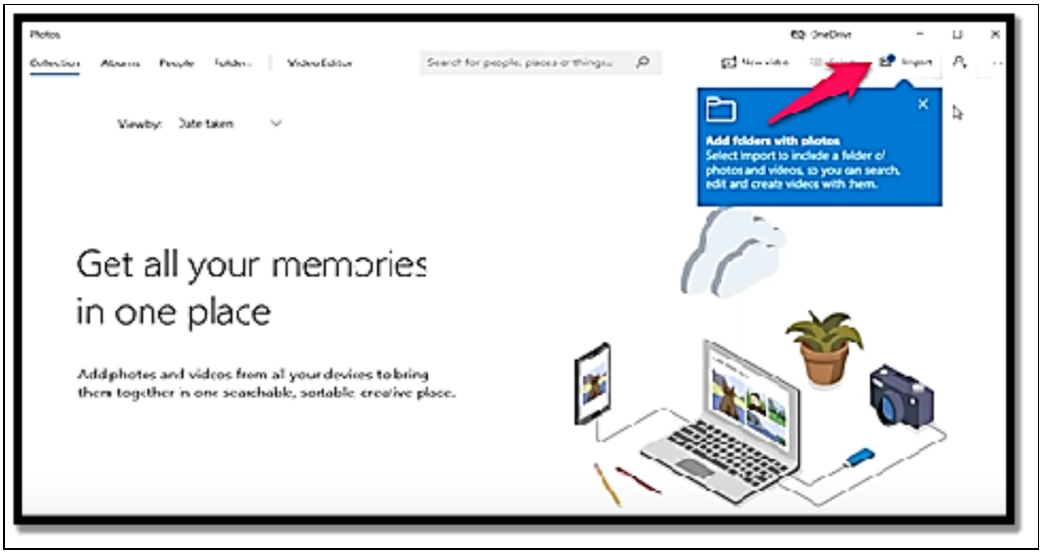
Images from other devices, including your camera, phone, and memory cards, can be imported into the Photos app.

**Connect the device to the computer and follow these instructions to import pictures from external storage:**

- Open **Photos**.




- Choose the storage from the left navigation page. You can also select the **Import button in the top-right corner.**




- Choose the images or check the **Select Option**.
- Choose the **Add button**.

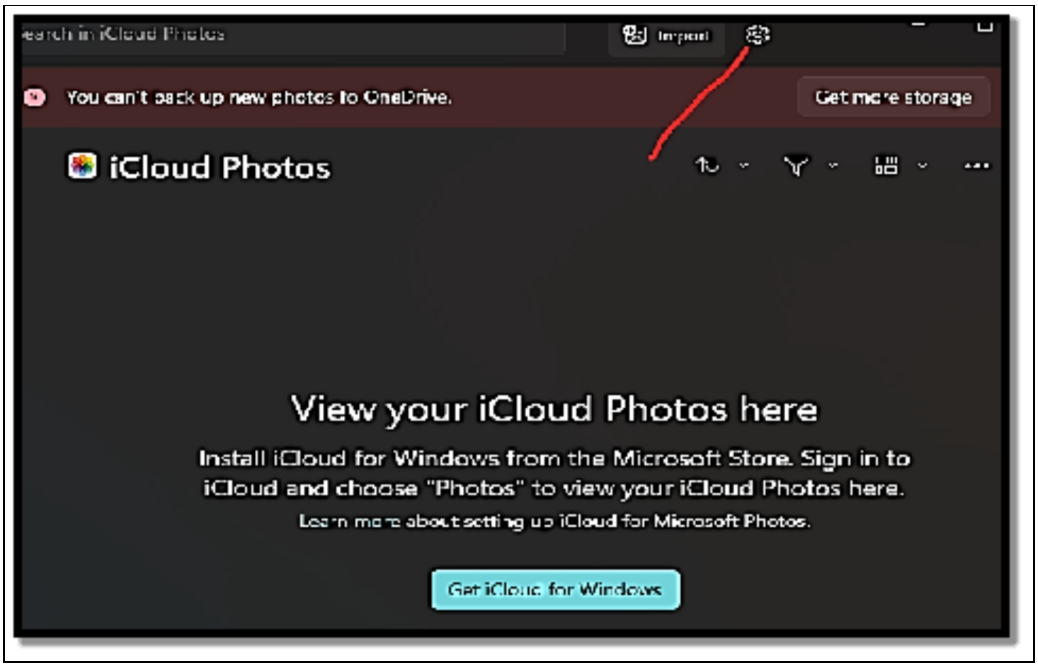
- Select the **Change button**. This step is quite important because, by default, the pictures will upload the images to OneDrive.
- Choose the location to import the files. You can make use of the **Create folder button to keep the newly imported images separate.**
- Choose the **Confirm button**.
- Choose the **Import button**. Once you have completed the steps listed above, the pictures will be imported to the location you indicated.

You can alter the color mode, disable characteristics, modify deletion settings, and add codecs for new video and image formats as part of the customization options available in the Photos app.

## Change color mode

**If you would like to modify the color mode of the Photos app, make use of the following steps;**

- Open **Photos**.
- Choose the **Settings button in the top-right corner.**



- Beneath the Personalization section, make use of the **Customize theme settings to alter the color mode to either Light or Dark.**

Once you have completed the above steps, the application will then alter the color mode to the color you have chosen.

## Connecting iCloud to the Photos App

In addition to displaying pictures from OneDrive, the new version of the Photos app also infuses the Apple iCloud service.

**If you would like to connect your iCloud account to the Photos app, follow the steps below;**

- Open **Pictures.**
- Choose **iCloud Photos**.
- Choose the **“Get iCloud for Windows” button if need be.**

- Choose the **Get button**.

- Choose the O**pen iCloud for Windows button from the Photos app**
- Sign in with your **iCloud account.**

## Viewing and Editing an Image in the Photos App

**To make use of the basic editing tool from the Photos app, follow the steps below;**

- Open **Pictures**.
- Open the **location of the image.**
- Click twice on the **picture** or click twice **on the file** to gain access to the Open option from the context menu, which also includes other options, like opening the file with File Explorer, sharing, copying, printing, and lots more.
- Choose the **Edit button.**

You can rotate or flip the image while on the editing page by using the rotating tools (including the slider and buttons) in the app's footer. You can crop a section of the image using the cropping tool. You can adjust color (such as saturation, warmth, and tint) and light (such as brightness, exposure, and contrast) using the Adjustment tool. You can use the Filter tool, which has a number of filters with predetermined styles that you can apply to each image, just like in the legacy app. And finally, you can draw on the image using the Markup tool. Two distinct pen types, a highlighter, and the choice to remove or clean all markings are among the available tools. When you're through with modifying the file, you can either replace the original image or save it as a copy. While viewing an image, you also have a few options outside of the editing page, including rotation, deletion, favorite, and sharing. You can access other options like resizing, fullscreen, and setting the image as the wallpaper by clicking the See more (three-dotted) button.

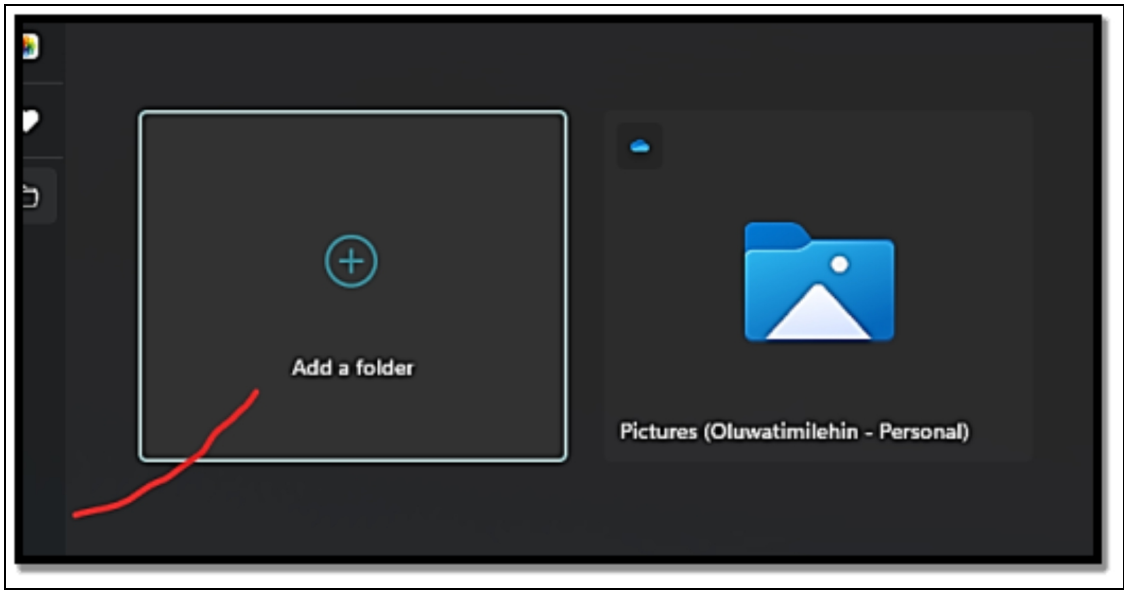
## Creating Videos

One of the very nice features of the Photos app is the fact that it also includes the Video Editor. Video Editor can be accessed as a different tab in the Photos app but it also has its own shortcut in the

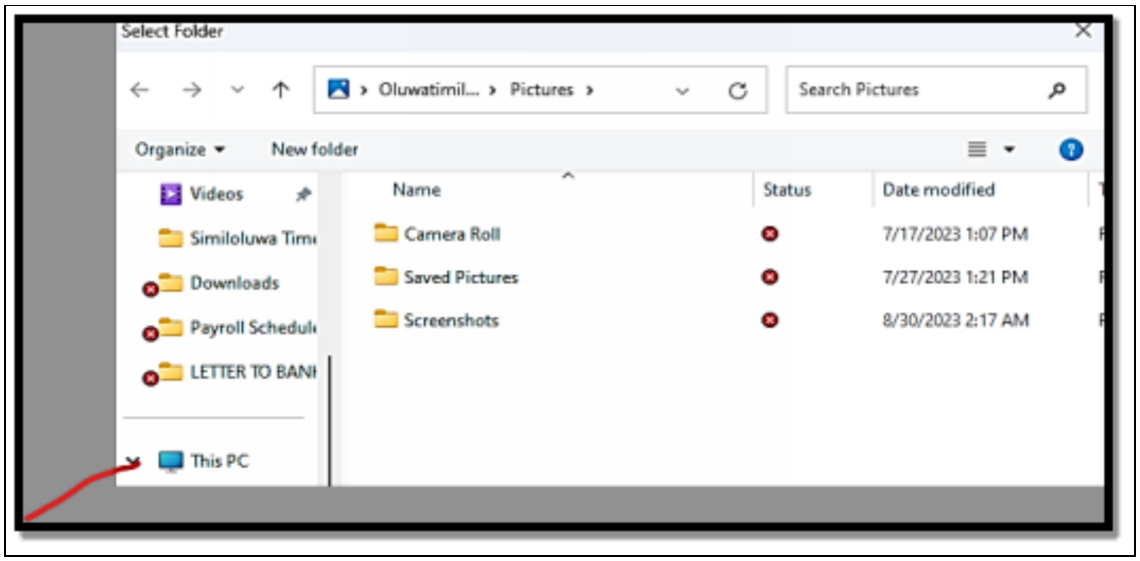
Start menu and some other places. With the use of the Video Editor, you are able to create your own movies from pictures you have shot. You can also choose to include some videos you have recorded with the use of your smartphone as well as your pictures, a soundtrack, and some other very nice effects. The result that will emanate from this will most likely be a very lovely picture that can be shared with friends and family. Video Editor is quite a complex tool and it includes so many other tools and options.

**Below is a basic tour of how to make use of it in the creation of a video;**

- Choose or touch the **search icon on the taskbar and insert the name "video editor".**
- Choose or touch the **Video Editor Search result.** The app will then be opened inside the Photos app.
- Select **New Video Project**, insert a name for your project, and choose or touch **OK**.
- Choose or touch **+ and then select From This PC**. The Open dialog shows, where you can have pictures and videos chosen from your PC.




- Switch **to your PC**, choose the files you would like to include in your video project, and then choose or touch **Open**.




**The files you have chosen will then be displayed in your Project Library.**

- Move your files to the storyboard at the lower end of the screen, where it says; “Move Items from the Project Library Here”. The items are displayed on the storyboard in the order that you have moved them. You can drag them around with the use of the mouse or the use of your finger if you are making use of a touchscreen.
- Choose or touch **Background Music** at the upper part of the screen, choose the track you would like to include in your video, and then choose or touch **Done**.
- Choose **Finish Video**, and then select the quality you would like to make use of, and then select or touch **Export.**

## Movies & TV App

The Groove Music app from Windows 10's first release works similarly to how the Movies & TV app does, except it is much pushier in making sales. After selecting All Apps from the Start icon, select Movies & TV. Microsoft initially only displays movies that you can buy. Finding out what movies and TV shows are on sale is the main focus of the Explore page, and the corporation will stop at nothing to get you to make a purchase. Fortunately, you can see certain trailers for free as well. Things that you've already purchased are listed

under the Purchased tab. The videos from your computer are displayed on the Personal tab, followed by just the ones in your Videos folder. The Movies & TV app won't show videos stored in other directories, even if it might be able to play them.

A video plays in a letterboxed window when you double-click or double-tap on it in the Movies & TV app or in File Explorer. There are all the standard controls available, including those to play, pause, go back 10 seconds, advance 30 seconds, adjust the volume, and show subtitles. The Movies & TV app is essentially a simple media player that also functions nicely with touchscreens. Try VLC Media Player if you want a program with more features and maturity that supports any movie format you may find online. You can buy it through the Microsoft Store.

## Gaming on Windows 11

Windows 11 has received a lot of praise from Microsoft for being the finest operating system for gamers. Although the firm did include a few new capabilities like direct storage and auto HDR, Windows 11 is largely the same as Windows 10 in this sense. When your PC has to transfer data from an NVMe solid-state drive to the graphics card, it can use a technical capability called direct storage to do so without using the processor. Games should load quicker because it reduces the amount of processing power needed by them to load textures. Direct storage, however, is a need for game developers, and none were available when Windows 11 was released. The use of an algorithm to evaluate the regular image from your game and convert it to HDR (high dynamic range) makes Auto HDR a little more intriguing. The technique upscales the image to a higher resolution using luminance data rather than resolution, with special emphasis paid to SDR (standard dynamic range) luminance data. It's beneficial to turn on HDR support if your monitor has it. Windows 11 includes the same tools as Windows 10 did, save for these two enhancements. Additionally, it contains an Xbox game bar and a gaming mode. I only discuss what is accessible to you, the user, in this chapter. I demonstrate how to use Windows 11's gaming tools and capabilities. You learn how to access the Xbox game bar,

activate game mode, and operate the various widgets on it. Anyone who owns a gaming laptop can learn how to change the graphics card's default settings for their preferred game. The chapter concludes by demonstrating how to redownload classic games like Solitaire and Minesweeper for casual gamers who miss them.

## Searching the Microsoft Store for Games

**If you would like to see the kind of games that will run on Windows 11, head to the Microsoft Store.**

- Choose or touch the **Microsoft Store** shortcut on the taskbar or you can also choose to start from the Start menu. This will open up the Microsoft store.
- On the left side of the pane, choose **Gaming**. A large number of tiles for games will be displayed. If you see a game that interests you, you can choose to check such a game out.
- Navigate to **Featured Free Games, and choose or touch See All next to it**.
- Choose or touch **any game** that is of interest to you. The Microsoft Store shows a total description of the game and shows you how you can install such an application. The description may have a notice that you can buy something when you are in the app. Move down farther and the description of the game will also have some indication of the very things that are available and how much it costs.
- If you would like to have such a game installed, choose **Get or Install**. You can install directly if the app is free but if you would have to buy the app, hit the button with the price.
- If there is a price, you would have to verify your billing details and also give a password. While the download is ongoing, you will be shown a progress bar in the Microsoft Store. Games with the mark Game Pass are free so long as you have an Xbox Game Pass that is linked to your Microsoft/Xbox account.
- If you would like to run the game, choose **the play icon** that shows after the game is downloaded and installed. The game also shows in the recommended list in the Start menu, just like

any other newly installed Windows 11 app. The game is also listed in the All Apps list.

The largest digital game distribution platform on the internet, Steam, is something serious players should think about joining. Despite being a respectable platform for distribution, Steam still has a much larger selection of games than the Microsoft Store. For PC, Mac, and Linux, Steam is available. It has integrated social networking, automatic game backups, and achievement tracking in-game, micropayments, and many more features.

## Enabling Game Mode

Game mode, which has been introduced in Windows 10 and stays as an active feature in Windows 11 can be described as a set of tools, options, and configurations that makes gaming more fun. According to Microsoft, game mode aids games render more frames on the screen while you play them by being focused on your PC's processing power on the game, not background tasks. The main idea here is that you enable game mode whenever you play a game to avoid very serious slowdowns, drops in frame rates, interruptions that may be a result of notifications, and any other form of disturbance. Theoretically, Windows 11 helps to check when you are playing a game and helps to enable game mode automatically. But this does not work all the time, especially when you are playing a much older title. **If you would like to see if game mode is allowed and to enable it if need be, follow the steps below;**

- Choose the **Start icon and then settings**.
- Choose **Gaming**. On the right, select **Game Mode**.
- Configure the **Game Mode toggle to on**.
- Close **Settings and commence the game.**

**If you are playing a much older game, and it doesn't seem like Windows 11 is enabling game mode for it, do the following;**

- While the game is being run, touch **Windows + G on your keyboard**. The Xbox game bar will then be shown.
- Choose **the gear icon (settings).**

- On the General tab, choose the **Remember This Is a Game option.** This will then inform Windows 11 that you are playing a game and it ought to enable game mode. If you do not see this option, the game is already on the list of tiles that are officially supported and everything is fine.

## Using the Xbox Game Bar

Game mode in Windows 11 has been created with quite a useful tool known as the Xbox Game Bar. When you commence a game, touch Windows +G. The game bar will be shown over your game, with diverse widgets that provide useful configurations and data.

**Follow the steps below if you would like to get used to the game bar;**

- Commence a game that you would like to play, and then **tap Windows +G**.
- On the game bar, choose or touch **the widget menu icon**. A menu with widgets that can be enabled and also disabled will be displayed. A star to the right of a widget's name shows that it is enabled. Choose or touch their name in order to enable or get them completely disabled.
- Choose or touch **the audio icons** to see just how audio devices are configured for your game. Alter the settings, if need be.
- Choose the **capture icon**. The capture widget is shown, with buttons for taking screenshots of your game, having to record the last 30 seconds of gameplay, recording a video of your gameplay, and then switching the microphone either on or off.
- Choose or touch **the performance icon**. The performance widget will then be shown, with real-time data about processor (CPU) usage, graphics card usage (GPU), RAM consumption, and the number of frames per second rendered on the screen (FPS). This data is of immense use to gamers who play video games that are quite demanding.
- Choose or touch **the Xbox Social icon**. If you do not get to see the icon, choose or touch > until you can no longer see it.

The Xbox Social widget provides you with tools you can use to chat with friends, see who is online, and so on.

- Choose or **touch the gear icon**. You can then get access to configurations that you can make use of to personalize game mode and the game bar.
- If you would like to conceal the game bar, choose or touch it anywhere on the outside of it or tap **Windows +G.**

## Advanced Graphics Settings and Optimization

An integrated graphics chip that enables them to provide basic video functions at minimal power consumption and a dedicated video card for more demanding programs and games are common features of gaming laptops. Based on the apps and games you use, Windows 11 does a fair job of selecting the appropriate visual card by default. Windows, however, could occasionally select the incorrect card. Alternatively, you might want to have Windows 11 use a particular graphics card for a particular game.

**Here's how to configure your PC's default graphics card for a particular game:**

- Choose or touch **the Start icon and then Settings.** This will open Windows 11 Settings.
- Ensure that the System is chosen on the left, and then select **Display on the right.**
- Choose or **touch Graphics.**
- Choose or **touch the name of the game** for which you would like to configure the default graphics card, and then choose or **touch Options**.
- Select between **Power Saving and High Performance** and then choose **Save**. Once done, anytime you play that game, Windows 11 will make use of the graphics card you have chosen, even if it may not be the best of choice.

**Below are a few tips that can be used to improve and also enjoy gaming sessions on your Windows 11 PC;**

## Turn on Game Mode

The performance of video games is greatly enhanced by using Game Mode. It improves your gaming experiences by diverting more system resources to gaming programs, disabling notifications, and minimizing most background activities.

- Click on the **Windows icon in the taskbar to launch the Settings program**, and then turn it on. Toggle the **Game Mode switch to the on position after opening Settings and going to Gaming > Game Mode**.

## Use Auto HDR

Standard Dynamic Range (SDR), the younger brother of High Dynamic Range (HDR), has significantly improved. With HDR, games seem even better thanks to improvements in color depth and brightness representation. As a result, try enabling Auto HDR. Simply choose System Settings in the Settings app on your device.

- Next, select the **HDR option under Display**. If you have several displays connected, select the one you want from the drop-down option. Check Display Capabilities after that. Switch the **Use HDR and Auto HDR choices to the on positions if the Use HDR option is supported.**

## Turn Off Enhanced Pointer Precision

The majority of gamers are unaware of this gaming advice. Windows 11 has improved pointer precision to increase mouse movement in an effort to improve user experience. A similar setting is already included in many video games' own control schemes, though. The mouse pointer moves less effectively as a result of the disagreement between these two settings. The setting was intended to do something very different than this. The best course of action for gaming systems is to turn off improved pointer precision. Open it by typing "Mouse Settings" into the Windows search box. Next, select Additional Mouse Settings from the Related Settings area by scrolling down.

## Update Your GPU’s Drivers

When their drivers are current, graphics cards from NVIDIA, AMD, Intel, and other manufacturers operate at their best. Therefore, you must regularly update your GPU drivers if you want to play games well. Factory-installed graphics card drivers are almost certainly out of current with a number of updates. Therefore, before installing or starting games on new PCs, take the time to update the GPU drivers. You may update your GPU's drivers in a few different methods, including manually downloading them or using specialized software made available by the GPU's maker. The good news is that all methods for updating your GPU on Windows 10 also function on Windows 11. You'll obtain the best results if you additionally take into account other aspects, such as older processors, slow or full hard drives, certain driver problems, overheating, and ancient graphics cards.

In order to generate fresh revenue from its classic (and formerly free) games, Microsoft has switched to freemium games. Freemium refers to a model of gaming where the core experience is provided without charge, but additional features or, in the instance of Microsoft Solitaire Collection, the removal of advertisements, require payment. Without having to pay anything, you can download and play Microsoft Solitaire indefinitely. However, the Premium Edition costs $14.99 a year if you want to remove the ads.

## Activity

1. Play music and videos on your system.
2. Play games on your system.
3. Look out for more graphic configurations you can make to your system.

# CHAPTER 13
# SENIOR-FRIENDLY FEATURES

Technology plays a very important role in ensuring that seniors remain connected with friends and family especially when there is a reduction in in-person interaction. Ensuring that tech-related devices are made very easy for older people to also make use of can help in ensuring that they are not left out of the fun! Older adults might not be so familiar with the use of technology or they may have certain limitations that make the navigation of complex interfaces seem like a very difficult task. With the help of Senior-friendly features, the operating system can be more intuitive and easier to make use of, helping to reduce frustration and also increase their independence. In this chapter, you will learn about the various features that are quite senior-friendly and how you can use them to your advantage or help an elderly person around you to make use of these features.

## Enlarging Text and Icons

Enlarging text and icons can be of great help in ensuring that seniors make lovely and much better use of Windows 11. As people grow older, their visions are bound to decline steadily hence they may begin to experience some difficulty with reading small text and differentiating between small icons. Enlarging text ensures it becomes very easy for seniors with reduced vision to read contents on their screens without the need to strain their eyes because this may also lead to them having headaches. Larger icons are also much easier to recognize and also tap which can be very useful for seniors that make use of touch screens or traditional mice. This can also help with the prevention of accidental clicks and ultimately help with the reduction of frustration and also reduce dependency.

## Enlarging Text

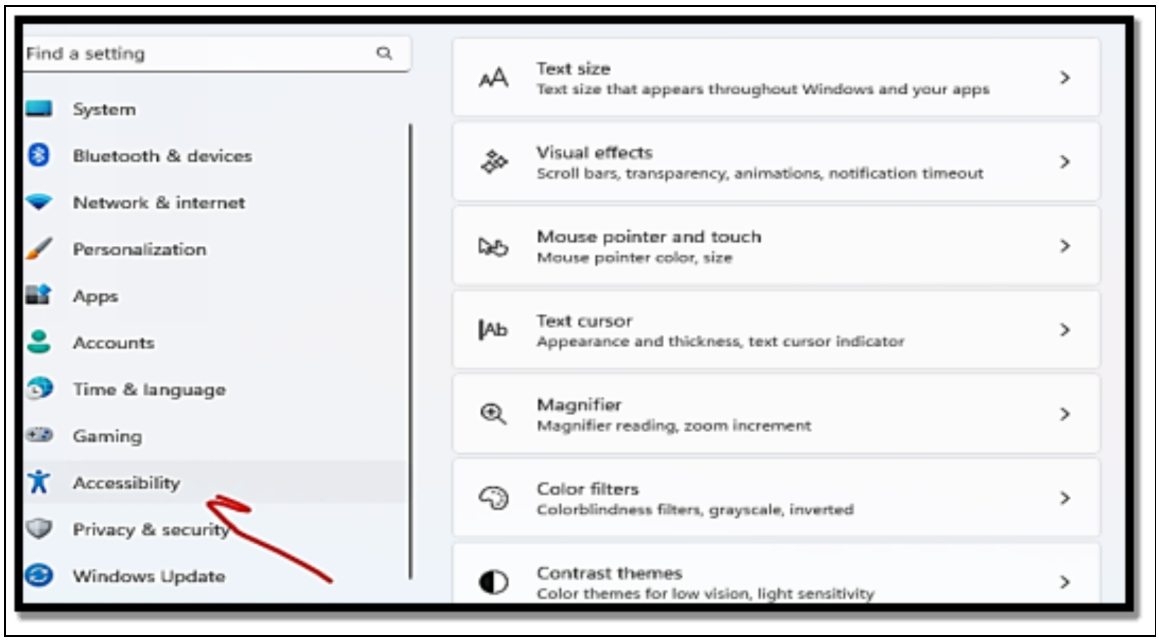
Although Windows 11 can configure the optimal font size, older people may like to make the text on display larger based on so many

situations. If the size of the font is too small on applications and icons or you would like to see the default font size, Windows 11 has an option that can help to alter the size of the font without having to change the display scaling so that you will not end up having to change the size of the elements on the screen.

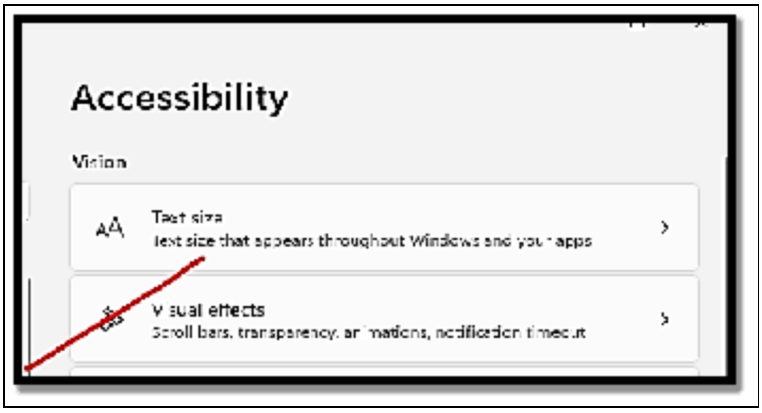
**If you would like to alter the size of text on Windows 11, follow the set of instructions below;**

- Open **Settings on Windows 11.**

- Choose **Accessibility.**




- Choose the **Text Size tab.**




- Make use of the Text size configuration to alter the font and make it much bigger on Windows 11.
- Once you are done and content with the size of the text, choose the **Apply button.**

## Enlarge Icon

The simplest way to alter the size of desktop icons in Windows 1 is by making use of the context menu.

**Follow the steps below to get this done with ease;**

- Right-click or touch and hold on the **desktop in order to bring up the context menu**.
- Choose **View.**
- From the icon size options, choose the preferred size that you would like to make use of. It is worth noting that medium icons are the default hence if you would like to make the icons bigger, choose Large Icons.

## Using shortcuts

On Windows 11, you may alter the size of desktop icons without using the desktop context menu by using shortcuts. Press 1, 2, 3, or 4 while holding down the Control and Shift keys on your keyboard. If you like smaller icons choose 4, as the Medium icon size is set at 3 by default. Choose 1 or 2 if you want larger icons.

## Voice Control and Cortana

Voice control and the use of virtual assistants such as Cortana can be a very important tool for people who are much older when making

use of Windows 11 most especially for those who may have physical limitations or have issues with making use of traditional keyboard and mouse interactions. Voice control gives quite a natural and more intuitive way to interact with a computer, which can be especially beneficial for older people who may find it difficult to make use of traditional input methods. With the use of voice control, there can be a significant enhancement of accessibility for older adults with arthritis or any other condition that limits their ability to type or make use of a mouse.

Cortana, Microsoft's answer to Apple's Siri and Google's Assistant, was first introduced in 2014 for Windows Phone. Cortana became accessible on Windows 10 and Android in 2015. The fact that Cortana is still catching up to the industry leaders hasn't helped with adoption. The Cortana app was deleted by Microsoft from numerous areas, and it is currently available for Windows only. Although the app continues to function properly, Microsoft won't make as many improvements as they have in the past, and most users will continue to ignore it. There are many reasons to prefer Cortana because it is intelligent and can provide you with actual assistance. However, Cortana has a cost, much like other virtual assistants. Your privacy is the cost. You need to provide a Microsoft account in order to utilize Cortana. Everything you do with Cortana after linking it to your Microsoft account is also recorded in Microsoft's database. Some users don't mind since they believe that the advantages of Cortana make sharing all of that personal information acceptable. In a true sense, Cortana is unable to perform its duties unless it has access to your email, calendar, and the information you see, hear, and search for. A two-way roadway exists.

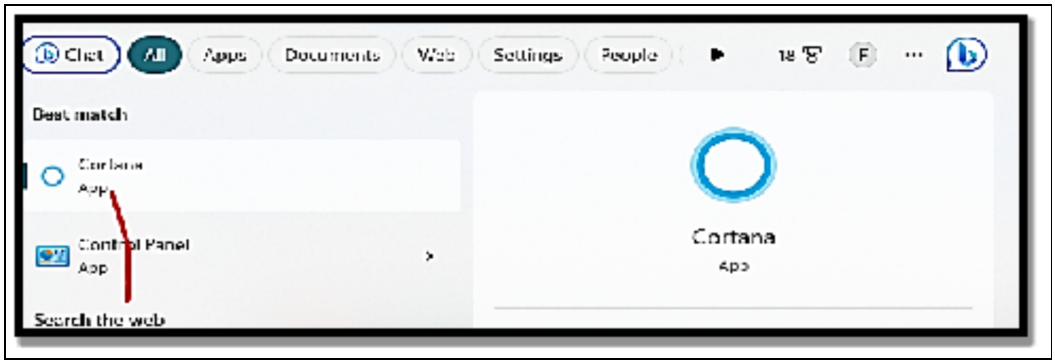
## Setting up Cortana

If there is a need for you to make use of Cortana, you will need to have a webcam or a microphone on your Windows 11 computer or device. Ensure that it is plugged in and working. Nevertheless, Cortana can be used only with a Microsoft account, a work account, or a school account. If you attempt to make use of Cortana on a local

(non-Microsoft) account, it first asks that you sign in with the use of a Microsoft account.

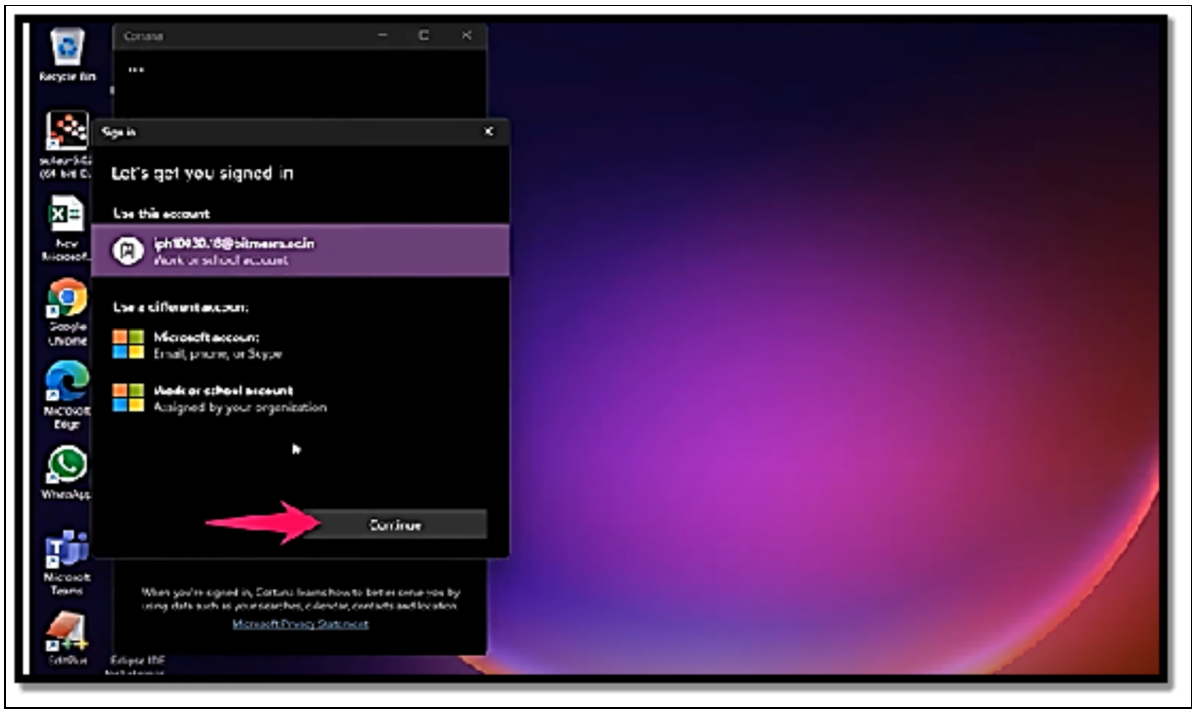
**Below is how you can configure Cortana with the use of a Microsoft account;**

- Choose or touch the **Start icon, all applications, and then select Cortana**. Windows 11 will then show the Cortana app




- Choose or **touch Sign in.**

- Select your **Microsoft account( if you are making use of one in Windows 11)**
- Choose or touch **Continue**. Cortana will then ask you to accept the fact that there is a need for it to access some of your personal information to work.



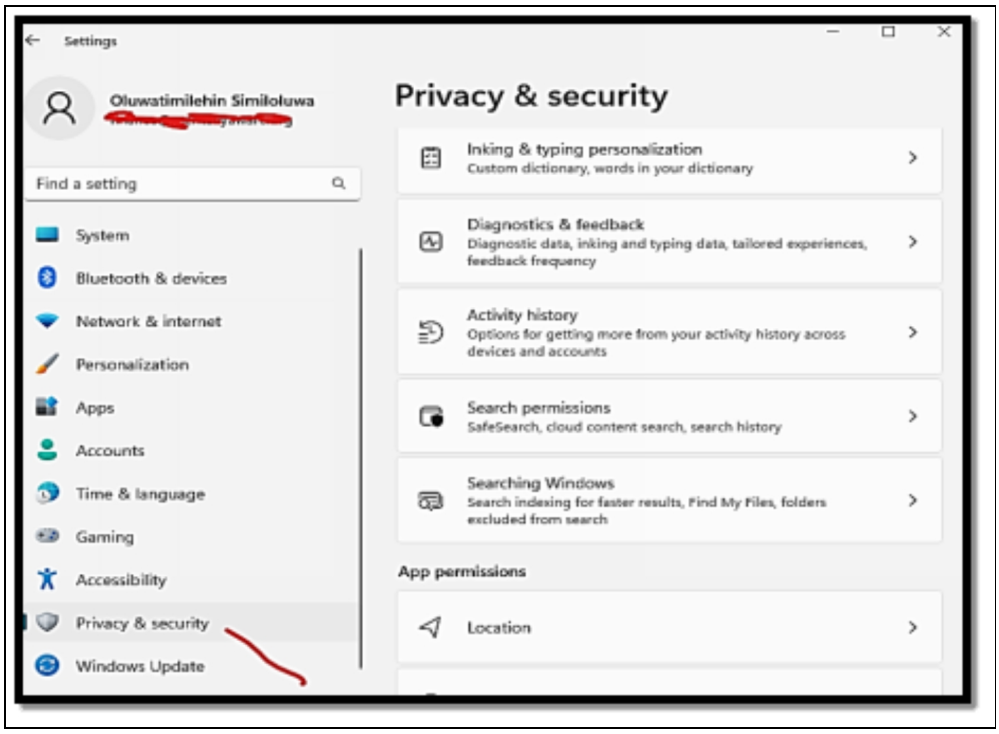

- Choose **Accept and Continue**. Cortana will then say Hi and let you know what you need to get done in order to be able to use the app.

## Turning on Voice Activation for Cortana

You must turn on voice activation in Windows 11 if you want Cortana to be as helpful as it possibly can be. When you do, Cortana will keep an ear out for your requests while also turning on when you call her by name.

**To make Cortana respond when you utter its name, follow these steps:**

- Choose or touch the **Start icon and then Settings**. Windows 11 will then show the Settings app.
- On the left pane, choose **Privacy & Security**. You will then see a long list of privacy and security-oriented features.




- On the right, move down to the **App Permissions section**, and then choose or touch **Microphone**. Voice Activation configurations will then be displayed.
- Choose or touch the **Cortana switch and then configure it to on.** Cortana will now be allowed to respond to the Cortana keyword.

- Close **Settings**.

Pinning Cortana's shortcut to the taskbar will enable voice activation without delaying startup. Right-click (or touch and hold down) the Cortana shortcut in the All Apps section of the Start menu, then select **More > Pin to Taskbar.**

# Using Cortana

It's time to start using Cortana now that you have set her up. I demonstrate how to launch Cortana using the mouse and voice commands in this section, as well as how to communicate with it using text and voice. Make sure you've enabled voice activation using the steps in the section above before continuing.

**Begin by using Cortana for a short while now:**

- Say Cortana; Cortana will then be displayed at the lower part of the screen, waiting for your command.
- Say a Command like Open Settings. Cortana will then open the Settings application and reply, I will open Settings.
- Close Cortana by tapping the **X icon in the top right.**
- Open Cortana once more, this time with the use of the mouse, by selecting or touching the **Start icon, All Apps, and then Cortana**. Cortana will then open in a different-looking window which also includes the history of your former interaction with it.
- In the Ask Cortana field type, configure a timer for about 5 seconds and then **tap the Enter key.**
- On the lower-right part of the screen, choose or touch the **Dismiss button** for the timer configured by Cortana.
- In Cortana’s app window, choose or touch the microphone icon, and say a command then pay attention to the reply of Cortana.
- Continue to practice by asking all sorts of questions and when you are satisfied, touch the **X icon and Cortana will close**.

# Exploring Cortana’s Settings

- Click or press the **three dots (visible in the margin) in the top-left corner,** then select **Settings to access Cortana's settings**. Cortana's access to the microphone and speech can be changed, and you can choose whether you wish to communicate with the app verbally, vocally, or both. If you choose to speak with Cortana rather than typing, you must grant it these permissions.

The most intriguing feature of the Settings menu is the Privacy area, where you may deny Cortana access to your data (contacts, calendar, email, and so on) or delete all of your conversations with her. You can also view the Microsoft Privacy dashboard, which displays all the information about you that Microsoft has saved in their cloud. Remember that shutting off Cortana will erase all she knows on this device, but won't erase anything from Microsoft's servers if, for example, you turn off her ability to keep track of your calendar information. Microsoft deserves an A for full disclosure, but a D for the amount of searching required to uncover it.

**Its settings contain the large Cortana off switch:**

- Click or press the **Revoke Permission and Sign Out option** after navigating to the Privacy settings as previously described. Cortana gets switched off once you confirm your decision.
- Click or touch the **Open button under Microsoft Privacy Dashboard** in the same **Privacy settings** if you want to access the information Microsoft has on file about you when using Windows 11 and Cortana. If necessary, log in using your Microsoft account once again. You arrive at the Privacy page for your Microsoft account, which is where Microsoft keeps all kinds of cool information about you.

You can view everything Microsoft has on file about you, including your search history, browser history, location history, Cortana voice activity, media activity, app and service activity, media activity, and more. Browse the many categories of information that have been gathered on you for a while, then tap or click Clear whenever you like. Sadly, you can't see the specifics. But at least you may clear a lot of your browsing history from this website. Lastly, elderly people

usually complain of boredom many times especially when they are retired and they have nothing substantial they are doing. Cortana can be quite useful and fun in situations like this.

**Below are some commands that you can instruct Cortana;**

- Tell me a joke!
- What's your favorite song?
- Recite Shakespeare!
- Can you talk like a pirate?
- Tell me about Halo!
- Make an impression!
- What is the meaning of life?
- Do you know Alexa?
- What do you think about Google?
- Testing!
- Tell me an animal fact.
- Can I borrow some money?

Furthermore, Cortana can also be quite productive and can be a very useful assistant.

**Below are certain things you can ask it to do for you;**

- **Check the weather:** You can say, what is the weather in Florida? Will it be sunny tomorrow?
- **Check the news:** Who won the match last night between Manchester United and Chelsea?
- **Do some calculations:** What is 12 multiplied by 12?
- **Make conversions:** How many meters are there in a mile?
- **Start Applications:** Open OneDrive.

# Activity

1. Enlarge the text and icons on your system.
2. Enable the use of Cortana on your system.

# CHAPTER 14
# TIPS AND TRICKS

## Keyboard Shortcuts for Efficiency

You might be skipping out on some time-saving tips if you use your mouse or trackpad a lot in Windows 11 for navigation and task completion. Learn about keyboard shortcuts that will speed up your work and increase efficiency.

**There are essential and basic keyboard shortcuts that can ensure that using Windows 11 feels much like a breeze;**

- Ctrl +A. choose all of the items in a particular window.
- Ctrl +C. Copy all of the chosen text or image.
- Ctrl +V. Paste the copied text or image.
- Ctrl + X. cut all of the highlighted text or items.
- Ctrl +Z. undo all of your former actions.
- Ctrl +Y. redo an action.
- Alt + Tab. Change between open windows or apps.

Many of these may be familiar to you, but if you're using Windows 11 apps and programs for the first time, they may make a significant difference. Imagine having to manually write in a lot of comparable data when working with Microsoft Excel when you could just copy and paste using keyboard shortcuts.

## More Windows keyboard shortcuts for productivity

Numerous potent keyboard shortcuts are available in Windows 11 that let you accelerate computer operations. The use of the exclusive Windows logo key sets this next collection of shortcuts separate from the fundamental shortcuts. This key activates the Start menu on its own, but when used as part of a shortcut, it can help you get things done faster and more efficiently.

- **Windows Key + Shift + S**. This screenshot shortcut helps with the opening of Windows 11 screen capture. It can capture the whole screen or just a certain rectangle or freeform shape that has been drawn.
- **Windows Key +. (period)**. Special characters. Include some personality in your writing and chats with the addition of emojis, special characters, and GIFs. This shortcut will then open a panel that displays all the options that cannot be found on a standard keyboard.
- **Windows Key + H**. (Helps with enabling voice typing). You can always talk in a very fast way just as you type. Once this Window is enabled

you will be able to put pen to paper, or words to document just as fast as you speak.

- **Ctrl + Windows Key + Left/Right Arrow**. (Change between virtual desktops and Windows). With Windows 11, you can arrange your applications into various virtual desktops. Make use of this keyboard shortcut to swiftly switch between them.
- **Windows Key + E. (File Explorer).** You can use this shortcut to quickly locate the files you are looking for and quickly open the Windows File Explorer.
- **Windows key + Z.** This shortcut is a very fast way to snap all your windows into place.
- **Windows Key + D**. This shortcut helps to minimize windows and takes you back to your desktop.

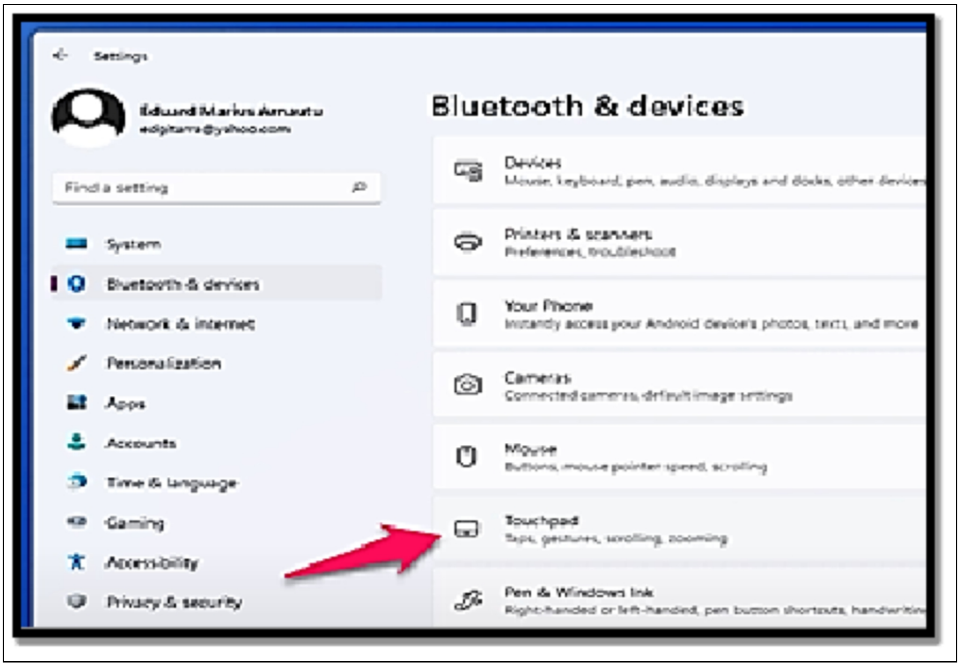
## Time-Saving Gestures on Touchscreen Devices

## Touch gestures

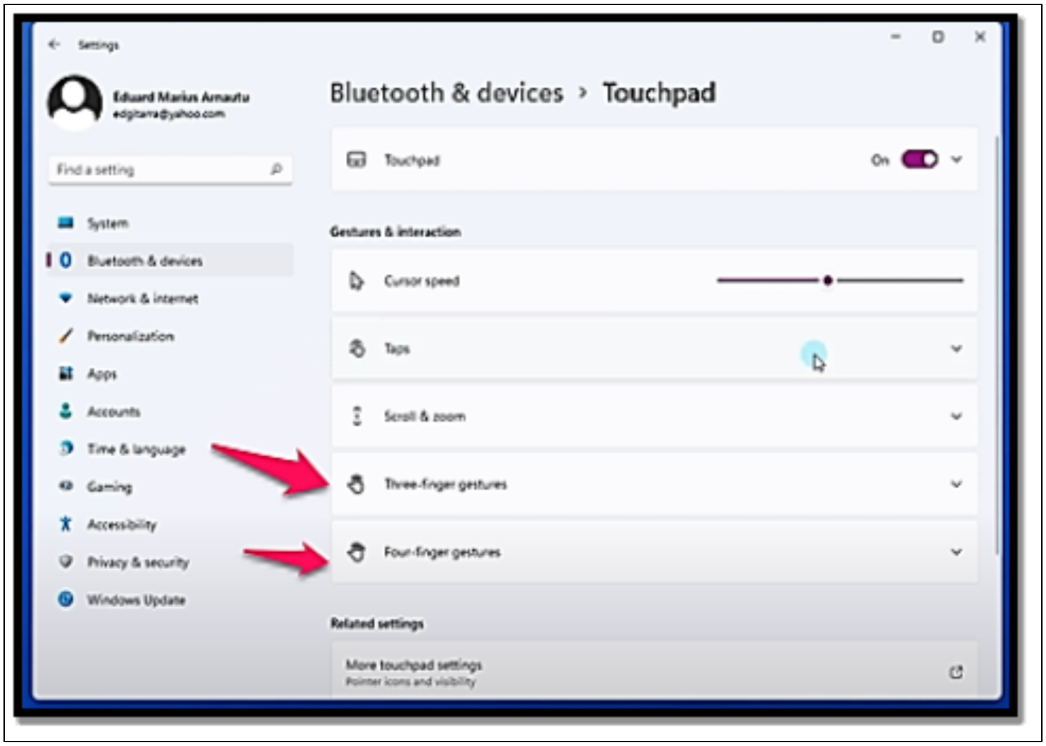
There are various touch gestures that you can use on the touch screen of your Windows 11 device. **If you would like to switch on touch gestures simply follow the settings below;**

- Select **Start > Settings > Bluetooth & devices**

## Touchpad




**Three-and four-finger touch gestures and then ensure it's switched on.**




It is worth noting that when touch gestures are enabled, three- and four-finger interactions in your applications may not work. If you would like to process the use of these interactions in your app, ensure this setting is turned off.

| Action | Gestures |
| --- | --- |

| | |
|---|---|
| Choose an item | Tap the screen |
| Scroll | Position two fingers on the screen and slide either horizontally or vertically. |
| Zoom in or out | Position two fingers on the screen and pinch in or stretch out. |
| Show more commands (like right-clicking) | Tap and hold the specific item to which you would like to see more commands. |
| Show all open windows | Swipe using three fingers up on the screen. |
| Show desktop | Swipe with three fingers down on the screen. |
| Switch to the last open app | Swipe with three fingers to the left or the right side of the screen. |
| Open the notification center | Swipe with one finger from the right edge of the screen. |
| Open the notification center | Swipe with one finger from the right edge of the screen. |

## Windows 11 Hidden Gems

Learning some of Windows 11's productivity tools is a smart idea at any time. You can do everything with the help of these built-in tips, from creating Taskbar shortcuts to conserving battery life. We've got you covered with our list of hidden features that you can utilize right away to get the most out of Windows 11, regardless of the Windows computer you use from Microsoft, Dell, HP, or another manufacturer.

## Minimize windows you are not using

You can easily minimize all open windows on your desktop, with the exception of the one you are working in, if it has become too cluttered. In Windows 11, you must enable this by going to

- **Settings > System > Multitasking and selecting Title bar window shake**.

Simply select the window you want to keep open by clicking on its title bar. Next, shake the window by quickly moving it back and forth while holding the mouse button down. All other open windows will quickly minimize after a few fast shakes, leaving only the one you've shaken open.

## Use the secret Start menu

You probably already know that you can get the Start menu by clicking the Windows icon on your keyboard or in the bottom left corner of the screen, but Windows 11 also has a second, less well-known Start menu. The Command Prompt, the Control Panel, and the Task Manager are all much easier to reach thanks to this menu. You can either right-click the Windows icon/Start button or press the Windows key + X to access it.

## Take a screenshot on Windows 11

Although it's a simple task, it's remarkable how quickly you can forget how to take a screenshot on your laptop or desktop if you don't do it frequently. You can snap a screenshot with Windows in at least seven distinct methods. The simplest approach to take a screenshot of your complete screen is to press the Windows key while holding down the Print Screen key. The screenshot will then be saved to the Pictures > Screenshots folder. Tap the **Windows key + Shift + S to launch the Snip & Sketch tool**, which lets you click and drag to generate screenshots that are saved to your Clipboard, allowing you to only capture a portion of your screen at a time.

## Access pinned items from your Taskbar with keyboard shortcuts

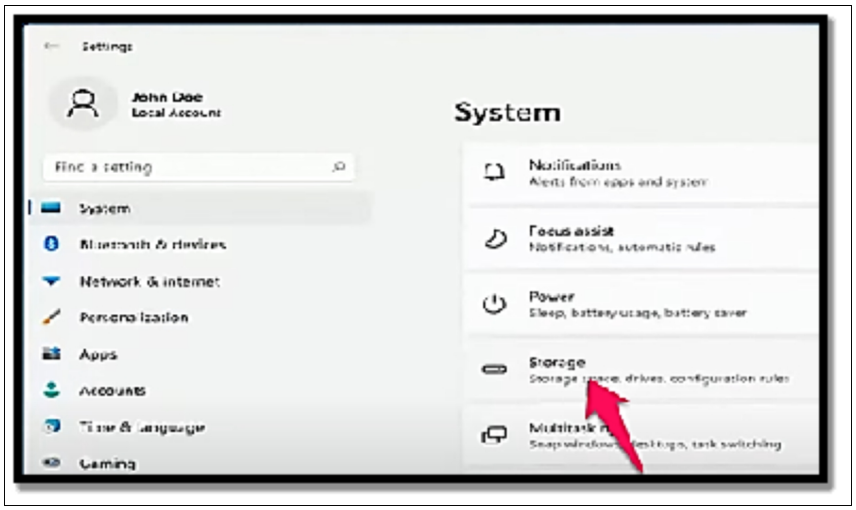
You don't need to click the icons to open apps that you've created shortcuts for by pinning them to your Taskbar at the bottom of your screen. Instead, use the keyboard shortcut Windows key + [Number key], where [Number] represents the Taskbar position of the program that is now pinned. To open the second pinned item on the Taskbar, press Windows key + 2. If you're typing quickly and don't want to take your hands off the keyboard, this is extremely helpful. Reaching for the Windows key could seem more natural.

## Clean up space-hogging apps

As computers run out of space, they begin to operate more slowly. Eliminating apps that take up more space than they need, especially if you don't use them frequently, maybe a quick method to speed things up.

**Go to**

- **Settings > System > Storage** to see how much space programs, temporary files, and documents are consuming.

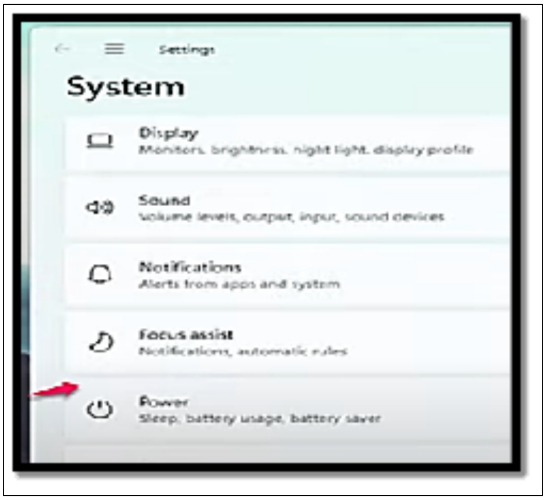



To view the entire list, select Show more categories. Choose Cleanup recommendations to see what Windows 11 suggests and get an idea of what to throw away. Your browser won't likely be eliminated, but you might decide that a game you haven't played in a long time is some useful dead weight to get rid of.

## Save battery by closing background apps

Even when you aren't using them, background-running apps can get information, send notifications, and stay current. Although it could be helpful, this can drain your battery and your data.

- Go to **Settings > System > Power** to manage which apps are using the background processing while also conserving some battery life and data.



To limit some notifications and background activity, select **Battery Saver** and then modify the time when Battery Saver comes on.

## Use background scrolling for multiple windows

Even if you're not currently working in it, Windows 11 allows you to scroll up and down on any window. This is a helpful tool if you want to glance through several windows at once, such as when you want to open additional sub-menu options in separate windows to avoid having to repeatedly go back and forth on the same page. Try launching two applications at once, such as a Word or Notepad and a web page in your browser. Place each such that you can see at least a portion of the text on each screen. Hover your mouse over the second window or use the touchpad to scroll while still in the first. You should be able to scroll up and down the page even while you are not actively using that window. If the feature isn't already turned on, go to **Settings > Bluetooth & devices > Mouse and turn the switch to "On"** for Scrolling inactive windows when I hover over them. Then you can position your mouse on a backdrop window and scroll using the scroll wheel.

## Show file extensions in File Explorer

Microsoft by default conceals file extensions, making it challenging for users to search for particular file types like JPEGs and JPGs.

**Do the following to view file extensions in File Explorer:**

- File Explorer Options can be found in the taskbar by typing it there and clicking. (There are other ways to get here as well, such as utilizing the Start menu's search function, but this approach works well.)
- In the window that shows, choose the View tab.
- Uncheck the box labeled "Hide extensions for known file types" if it is already checked. Click **Apply and then OK.** All file extensions in the File Explorer should now be visible.

## Use Focus Assist to help reduce distractions

When you're trying to complete work but continually getting distracted by notifications, it's annoying.

**Focus help lets you control how many you receive.**

- Go to **Settings > System > Focus** aid to configure it. Select from the following three options: Off (get all notifications from your apps and contacts), Priority only (see only selected alerts from a priority list that

you specify, and send the remaining ones to your action center), and Alarms only (only display alarms).

Additionally, you may decide to have this function switch on automatically at specific times, such as when you're playing a game or using an app in full-screen mode.

## Activity

1. Mention 5 keyboards that can be used for better efficiency.
2. Mention 5 time-saving gestures that can be used on touchscreen devices.

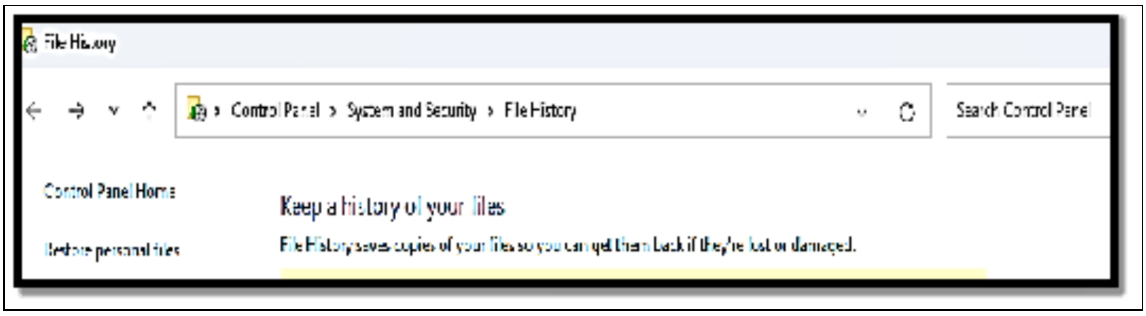
# CHAPTER 15
# BACKUP AND DATA RECOVERY

You're probably in this chapter seeking something that no longer exists if you're used to using earlier versions of Windows to backup or restore data, ghost (clone) an entire disk, or set restore points. In favor of new (and user-friendly) solutions, Microsoft is deprecating (killing, zapping) all the outdated backup and restoration features. OneDrive, which stores everything in Microsoft's cloud, and File History, which preserves everything on a storage device you own, are the two Microsoft tools that are primarily pushed for this duty in Windows 11.

## Backup Your Files

Windows 11 requires an external hard drive, a second hard drive, or a network connection that connects to a hard disk in order to use File History. In this illustration, I'm using a USB external disk that is attached to my computer. You can also use a hard disk on a different computer on your network or a cheap external hard drive that you can buy at any computer store. The initial File History backup can take many hours if your Photos folder contains a large number of images or your Documents folder contains a huge number of files. Make sure you're prepared to give the machine a lot of time to work if you have a lot of data and this is your first time backing it up. **Add an external drive to your computer and take the following actions to start File History:**

- Choose or touch the **search icon on the taskbar and enter the file history.** The search results will then be displayed.
- Choose or touch the **File History search result**. The file history window will then be displayed, showing your external drive.




- If more than one drive is connected, choose or touch **Select Drive, choose the drive you would like to make use of for File History,** and then choose or **touch OK.**
- Select or touch the **Turn on button**. File history will commence and inform you that it is copying your files for the first time.
- If need be, close the **Control Panel.** You can get other tasks done while File History continues to work in the background.

## Checking if the File History backs up your data

Take matters into your own hands and use File Explorer to search for the backup rather than relying on the File History software to inform you that it happened. The procedures below might help you locate and verify your backup files.

- Choose or touch **the File Explorer icon on the taskbar**. File Explorer will then be opened.
- Navigate to the drive that you have just used in the preceding steps for a file history backup. This may be an external or a networked drive; it may also be a second drive on your PC, nevertheless, I do not recommend it.
- Click **twice** on your way through the folder hierarchy
  - File History
  - Your username
  - Your PC name
  - Data
  - The main drive you backed up (probably C:)
  - Users
  - Your username (again)
  - Desktop (assuming you had any files on your desktop that you backed up), or Pictures, or some other folder of interest

- Check if the filenames are a match to the files on your desktop in your pictures folder, or in any other folder you like, with dates and times included at the end of their name.
- **Do any of the following;**
  - Close **File Explorer and the File History dialog box** if the files are identical. Although you can use File Explorer to restore data from this location, using the File History retrieval tools is simpler.
  - Make sure File History is configured properly by going back to Step 1 of the list above if you don't see filenames that resemble the files on your desktop.

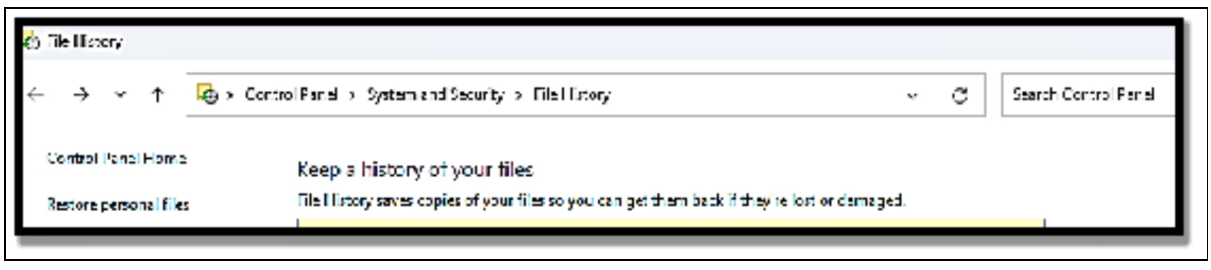
If the backup drive is detached or the network connection to the backup drive is lost, File History does not function, but Windows 11 still creates File History files. File History immediately dumps all of its data to the appropriate area as soon as the disk is reconnected or the network begins operating normally.

## Restoring data from File History

Unless you modify the frequency, File History retains snapshots of your files that are taken once every hour. You can retrieve a copy of the spreadsheet that is less than an hour old if you spent the previous six hours working on it and realized you made a significant error within the last half hour. File History can also be useful if you've been working on your resume for the past three months and realize that you really don't like how the design changed five weeks ago.

**Follow the steps below to restore your files from File History;**

- Choose the **search icon on the taskbar and enter file history**. The search results will be displayed.



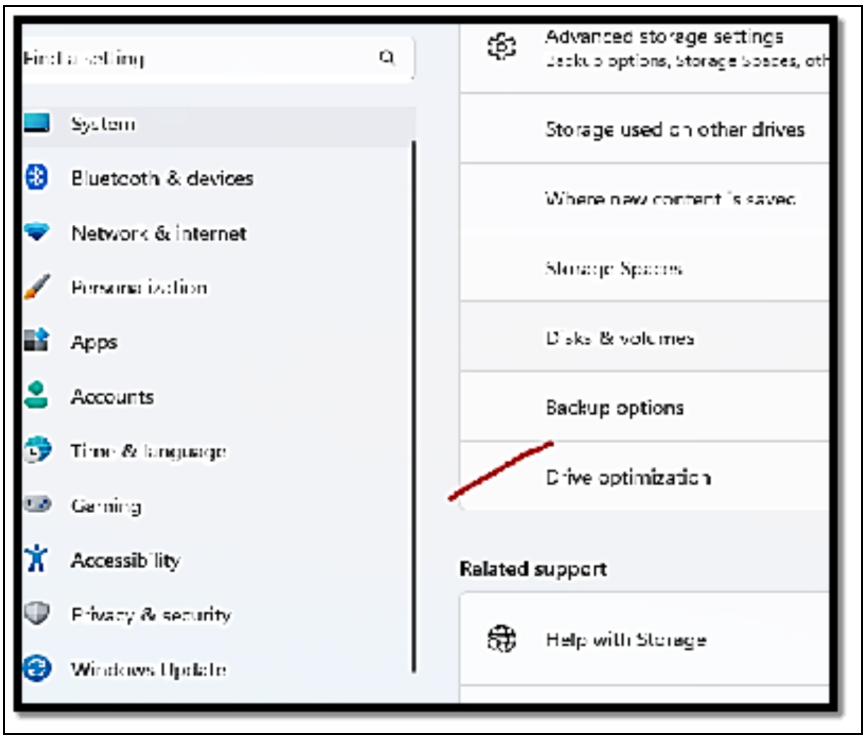
- Choose the **File History search result**.
- Choose **Restore Personal Files.** The File History will then restore the Home page.
- Move to the place where the file you would like to restore is.
- Check the time and date in the upper-left corner and get any of the following done;
  - If the file's time and date are visible, click or **tap the file to select it,** then click or **tap the arrow-in-a-circle (restore) button to bring the file back**. The file can also be moved by dragging it to the desired spot. By double-clicking the file, you can even view a preview of it.
  - The left arrow at the bottom will take you back to the earlier snapshot if the time and date are incorrect. To navigate to earlier and more recent versions of the files, use the left and right arrows, accordingly.
- Without initially selecting a particular file, click or **tap the arrow-in-a-circle at the bottom** of the screen to restore all the files shown in the File History window.
- Select which files you want to replace or choose to **Replace All Files in the Destination**, which deletes the most recent version of each file.

## Using Windows Backup and Restore

The popular built-in function Backup and Restore can essentially meet users' backup and restore needs. With the use of this feature, you can escape getting files deleted without any way for you to be able to retrieve them.

**Follow the steps below to make use of this amazing feature;**

- Connect an external hard drive to your computer to start with. Next, **locate System > Storage > Advanced storage settings > Backup Options**.




**Once done, choose the Add a drive option beneath Back up using File History.**

- Select **On beneath the Automatically Back Up My Files option**.
- Choose **More options** to configure just how often File History should back up, how long it keeps those backup copies, and also the specific files it will back up.
  - **Back up my files**: By default, File History will back up your files every hour, but you are at liberty to alter this setting. There are various options available for doing this from as little as 10 minutes to 24 hours.
  - **Keep my backups**: It is configured to keep backups forever by default, but also you can choose to alter this setting in order to keep them from just a month to about 2 years before getting them deleted.
  - **Backup these folders**: You can view the complete list of folders in this window and include more folders you would like to back up by choosing Add folder. You can also select a folder here and make use of the Delete button so as to prevent Windows from backing it up.

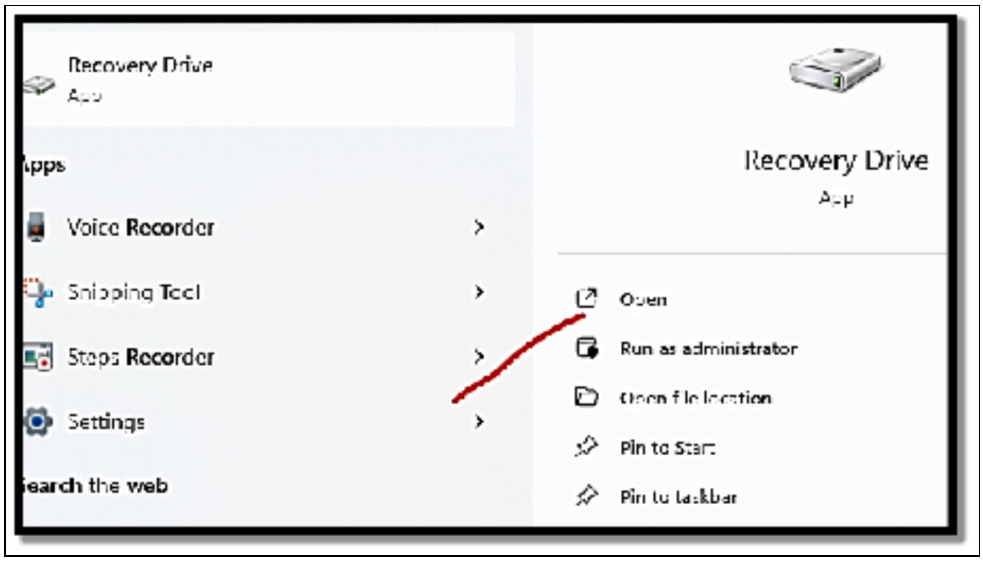
- When you are done backing up the files, save and exit. Then choose back up now. Windows 11 will then instantly back up your files to the drive when you connect it to your computer.

## Creating Recovery Drives

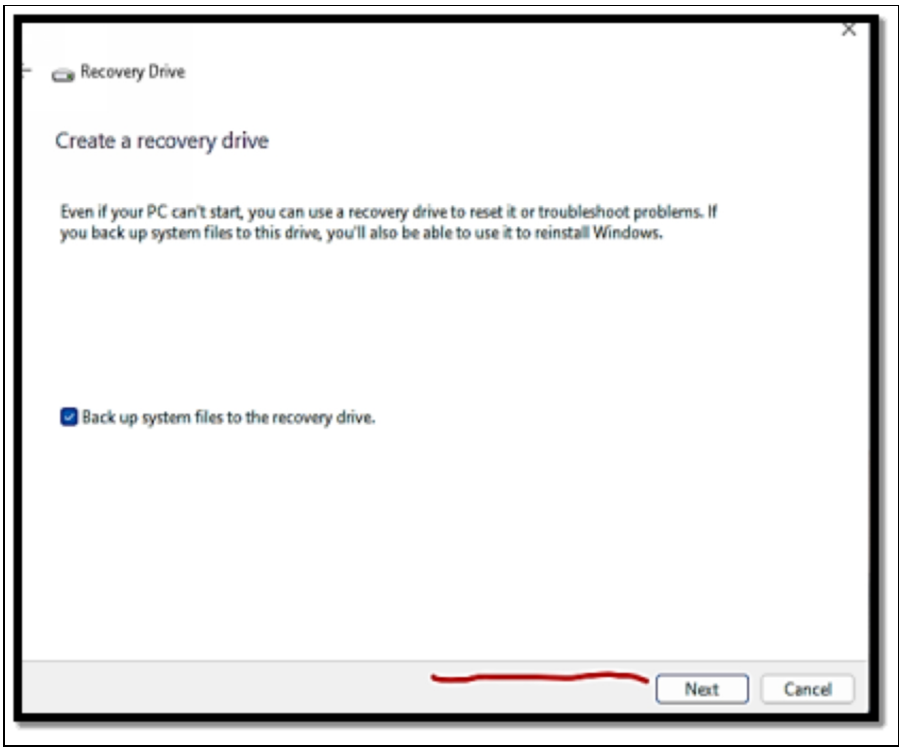
To assist you in creating a recovery drive, Microsoft includes the Recovery Drive software with Windows 11. Any USB drive will work; however, Microsoft suggests a minimum of 16 GB of storage. However, make a backup of all the data on the USB drive to your computer or an external device before making a recovery drive.

**To establish a Windows 11 recovery drive, repeat these steps:**

- Attach **a bootable USB recovery drive to your Windows computer**.
- Tap **the Windows key** in order to open the **Start menu, type Recovery Drive in the search bar, and choose the Open option.**




- The User Account Control will then be displayed. Choose **the Yes option** in order to open the tool.
- Choose the **Backup system files to the recovery drive checkbox** and then select the **Next button**. It can take some time for you to list all the drives that are available on your system.




- The tool will list the available USB drives that are on your system and will also notify you about the capacity of the USB drive you will need for it. Choose the correct one and select the **Next button.**
- You will see a warning about deleting all data present on the chosen USB drive. Choose **the Create button.**
- Wait patiently for the process to be completed. After that, choose the **Finish button in order to close the Recovery Drive window.**

# Activity

1. Back up your files to ensure they do not get lost.
2. Create recovery drives.

# CHAPTER 16
# NETWORKING AND CONNECTIVITY

Our ability to share, interact, and communicate with one another utilizing a variety of devices defines modern computing. Today, the majority of that activity takes place online using the internet, the biggest global network, and a range of widely used hardware and software standards. Cloud-based services, which are changing the way we work and play, are likewise driven by the internet. A local area network (LAN), which enables the sharing of files, printers, and other resources in a home or office, can be built using the same network standards that permit connections to the Internet.

In the past, configuring a network connection might be difficult and frequently necessitated expert assistance. Network hardware is widely available today, and Microsoft Windows 11 network connection setup takes little to no technical expertise. That doesn't mean that the procedure is completely painless; troubleshooting network issues may be frustrating, and being familiar with the fundamentals of networking is very beneficial for identifying and resolving issues. The fundamentals of connecting a Windows 11 device to wired and wireless networks in a home or small office are covered in this chapter.

## Connecting to Wi-Fi Networks

Before you can establish a connection to the internet or any local area network, there is a need for your Windows 11 device to work with a network adapter, which must have been well installed with working drivers. Since the release of Windows 7, Microsoft hardware certification has had an important request that all desktop, PC, laptop, and portable devices should include modems that are able to establish a connection with mobile broadband networks, and Bluetooth adapters that offer support to limited types of direct connections between PCs. Typically, you will be able to locate wired Ethernet adapters in desktop PCs and all-in-ones, where a

permanent wired network connection is appropriate. These adapters can be infused into the motherboard and can also be installed in an expansion slot and allow RJ45 plugs at either end of shielded network cables. The Gigabit Ethernet standard, which permits data transfers at up to 1 gigabit (1,000 megabits per second), is supported by the majority of contemporary wired adapters. You can connect your network adapter to a wall jack in an Ethernet-equipped room or office, and the wall jack will then connect to a router, hub, or switch at a central location known as a patch panel. You have to plug directly into a network device if your home or place of business lacks organized wiring. Consider purchasing a USB network adapter if you yearn for the constant connection speed and dependability of a wired network but own a portable PC or mobile device without a built-in Ethernet connection. Fast Ethernet speeds (up to 100 megabits per second) are supported by USB 2.0 ports, but Gigabit Ethernet speeds should be supported by contemporary devices with USB 3.0 or USB 3.1 connectors. While seated at your desk, you can instantly connect to a wired network and other expansion devices with a single USB Type-C connection using network docking stations and USB hubs that come with Ethernet adapters. All laptops as well as mobile devices made for Windows 11 have a Wi-Fi adapter that has a transceiver as well as an antenna that can communicate with a wireless access point. Wireless adapters are also becoming very common in desktops, enabling them to be used in homes and offices where it is not possible to run network cables. Ethernet and Wi-Fi are the main networking technologies used in homes and offices. In lieu of twisted-pair wiring basically used to connect endpoints on wired networks, you can make use of existing coaxial cable installations, like those used by cable TV systems, with adapters at endpoints that offer support for MoCA technology (Multimedia over Coax Alliance). Each of the adapters has a connector for an Ethernet cable. This configuration allows you to establish a connection to PCs with the use of Ethernet adapters at Gigabit Ethernet and much higher speeds.

Certain alternatives include powerline technology, which helps to communicate with the use of adapters that connect to the same AC

receptacles you use for power, and phone-line networks, which link into telephone jacks in older homes. Phone-line and power-line technologies have been relegated to a niche status due to the accessibility of affordable wireless network equipment; they are most appealing in older homes and offices where adding network cable is impractical and where wireless networks are unreliable due to distance, building materials, or interference. (A hybrid strategy, helpful in some settings, enables you to connect a Wi-Fi extender to an existing power line to boost signal strength in a remote area or to build a so-called mesh network.) Long gone are the days when you have to rely so much on a single type of network. If your modem has a router and a wireless access point, you can plug in network cables and make use of its wireless access signals for mobile devices or for computers that can be found in areas where a network port cannot be found. Windows 11 detects and also helps with the configuration of hardware instantly, installing drivers from its built-in collection. A wired internet connection ought to be detected instantly; you will basically be prompted to insert the access key for a wireless connection while the setup process is ongoing.

## Checking network status

In Windows 11, the majority of network connections are configured automatically during installation, while you could be asked for security credentials to connect to a wireless access point. Windows 11 comes with tools that let you check the connection's status, make adjustments, or troubleshoot issues. The status icon, which by default may be seen in the system tray area to the right of the taskbar, is the network tool that is the easiest to use.

**This icon displays the network status and current network type (wired or wireless).**

- When you click that icon, the **Quick Settings menu will appear**, offering options specific to your network connection type as well as additional Windows settings.

To check for wireless networks, choose **the arrow to the right of the Wi-Fi** to show a list of wireless networks that are available and

show their SSID along with their signal strengths.

**If you would like to disable Wi-Fi,**

- **Slide the switch located at the top of the dialog to the off position**. You will then be prompted to **pick when to have the Wi-Fi back on**. You can also choose to opt to get this done manually, which is the default, or you can also choose to schedule this for about one hour, four hours, or one day from now.

When you're traveling and can only obtain a spotty Wi-Fi signal (which could deplete your PC's battery as it tries to connect repeatedly), or a paid Wi-Fi option that you've decided is too pricey, the option to temporarily disable Wi-Fi can be useful. You may reconnect without having to remember to manually turn on Wi-Fi again by setting a timer. Note however that the Wi-Fi switch located at the top of the page enables you to either disable or enable the wireless adapter. If you happen to be connected to a wireless network, the entry at the lower part of the switch displays the name of the network in use; choose that entry in order to get detailed properties for the Wi-Fi connection.

**You can also choose to configure the settings below from this page;**

- Show **Available Networks displays a list of Wi-Fi networks** that can be found close by and are available to be connected to.

- **Manage Known Networks enables you to check networks you have once established a connection with before and either alter or review the settings for those networks.** You are also at liberty to either choose to forget a network or to manually add a connection to an unadvertised Wi-Fi network.

## Connecting to a wireless network

If you are in a location with a public or private wireless access point managed by someone else, you should have already configured and tested a wireless access point (often included as a feature in cable modems, internet-facing routers, and other network access devices provided by your broadband provider). When the wireless network adapter is installed and turned on in your computer, Windows searches for nearby wireless access points.

- When you **choose the Network icon** in the system tray and then choose **the arrow to the right of the Wi-Fi button**, you are most likely to see various access points available for connection, most of them owned by your neighbors or visitors who are visiting.

When you choose an available wireless connection, assuming it is known, and then you have the option to choose the **Connect Automatically checkbox**. When you are within range of the network in the future, your computer will instantly make use of the saved password and then connect to the network.

- When you click on **the connect button** for a secure wireless access point, it will show a box in which you are to insert a network password.

If what you insert is a match to what has been saved in the access point's configuration you are in. Getting in is quite easy on a network you are in control of, where you configure the network security key. For a secured access point controlled by someone else; a doctor's waiting room, a coffee shop, or a friend's office there is a need for you to ask the owner of the network for the password.

- Click or tap **a Wi-Fi access point's entry in the Quick Settings menu**, then select **Disconnect to disconnect from it**. By doing this, the choice to connect to that network automatically in the future is automatically disabled.
- When you connect to a Wi-Fi access point, Windows 11 remembers your login information so you can connect the next time with just a tap. If the idea makes you uneasy, choose **Settings > Network & Internet > Wi-Fi and select Manage**

**Known Networks to view and manage the entire list of networks.**

A service set identifier, more often known as an SSID, is the name given to any wireless network. Some wireless networks are configured so that they don't broadcast their SSID in an effort to enforce security through obscurity. Since its name doesn't appear in the list of accessible networks on the network flyout Quick Settings Menu or in Network & Internet Settings, connecting to such a secret network is a little more difficult. However, you can establish a connection to such a network if you are aware of its name and security options. It is worth noting that configuring a router so that it does not show its name has been well-promoted by certain security measures. Although it does make the network less accessible to casual snoops, the lack of a broadcast SSID is no deterrent to a knowledgeable tracker.

**To connect to a hidden network,**

- Open **Settings > Network & Internet > Wi-Fi > Manage Known Networks and then choose Add Network.** There is a need for you to insert the network name, choose the security type, insert basic security information, and then choose Save.

# Settings up VPNs for Privacy

The term "Virtual Private Network" (VPN) refers to a technology that establishes a safe connection between a device and a particular network to allow remote access to files and resources. Typically, businesses install a VPN server to enable staff to connect via a VPN client, access resources, and do business as if they were physically present at their desk. However, there are also independent VPN services that function in a similar manner. However, these services offer an encrypted connection that enables devices to connect to their networks (located in key places all over the world) to access the internet while concealing your public IP address, providing a more private and secure web browsing experience. A VPN service is a good choice for getting around geographical restrictions to access banned content and online services (like the US version of Netflix)

from other countries in addition to the added layer of protection and privacy.

**If you would like to configure a Windows 11 VPN connection, follow the steps below;**

- Open **Settings**.
- Choose **Network & Internet.**
- Choose the **VPN page from the right side.**

- In the VPN connections setting, choose the **Add VPN button**.
- Make use of the VPN provider drop-down menu and choose the **Windows option.**
- In the Connection name setting, insert **a name that can identify the connection**. For instance, you can make use of a service name such as IPVissh, or Private Internet Access.

- In the name of the server of the address setting, you can insert the address of the VPN server for instance; vpnserver.com or 122.122.122.122.
- Make use of the VPN type drop-down menu and choose the Automatic option of the protocol needed to connect to the particular VPN server.
- Choose the authentication method making use of the **Type of sign-in-info drop-down menu.**

**To connect a VPN, follow the steps below;**

- Open **Settings.**
- Choose **Network & Internet.**
- Choose the **VPN page from the right side.**
- Choose the **Connect button for the connection.**

**To disconnect a VPN;**

- Open **Settings**
- Choose **Network & Internet**
- Choose the **VPN page from the right side.**
- Choose the **Disconnect button.**
- Finally, choose the b

## Sharing Files and Printers

A large portion of Windows 11's networking infrastructure is an improvement of capabilities created decades ago when the internet was still an intriguing experiment. A cloud-based service like OneDrive is now the simplest way to share files, digital video, and other resources, even between PCs in the same house or office. If you have a Microsoft 365 Business or Enterprise subscription, you can effortlessly collaborate with coworkers, clients, and suppliers by using Teams and SharePoint in addition to OneDrive for Business.

Nevertheless, there are still very valid reasons for Windows PCs to connect and share resources across a local area network. These traditional networking tools and techniques are totally supported in Windows 11, and you can choose to make use of them alongside OneDrive sharing or Microsoft 365 collaboration features if there is a need for you to. The underlying system of share permissions as well as NTFS permissions for controlling access to objects are still in Windows 11, working much like it has in previous versions of Windows since the days of Windows NT.

**In a similar vein to Windows 10, Windows 11 provides you with two ways in which you can share file resources, whether you are doing so locally or with the use of the network;**

- **Public folder sharing**: When you position files and folders in your Public folder or its subfolders, those files are usually made available to just anyone who has a user account on your computer. Each person who signs in will have access to their own profile folders (documents, music, and lots more), and everyone who signs in has access to the Public folder. There is a need for you to search well for the Public folder, which, unlike other profiles, will not show under Desktop in the left pane of the File Explorer. Navigate to C:\Users\Public. If you make use of the Public folder quite well, you can choose to pin it to the Quick Access list in File Explorer.

By default, all users that have an account on your computer can sign in and also create, view, modify, and delete files in the Public folders. The person who helps to create files in a public folder is the owner of the file and also has complete access to the file. All others who sign

in locally have Modify access. Settings in Advanced Sharing Settings (accessible from **Settings > Network & Internet > Advanced Network Settings**) determine if the contents of your public folder are made available on your network and if inserting a username and password is needed to gain access.

If you switch on password-protected sharing, only network users who have a user account on your computer will be able to gain access to your public folder files if you allow the use of network sharing of the public folder. You are unable to search which network users get access, nor are you able to specify various access levels for various users. Sharing through the Public folder is very fast and easy but it is quite inflexible.

- **Advanced sharing**: When you choose to share folders or files outside the Public folders, you can choose to indicate precisely which user accounts are able to gain access to your shared data, and you can also choose to indicate the various types of privileges those accounts can enjoy. Furthermore, you are able to grant various access privileges to various users. For instance, you can choose to enable some users to modify shared files and also create new ones, enable other users to read files without making changes to them and lock out other users' altogether.

There is no need for you to decide between sharing the Public folder and sharing certain folders since you can choose to mix both methods simultaneously. There is a possibility that you find a mix of sharing styles that works well for you; each has its own benefits.

- Sharing certain folders is best for files you would like to share with certain users but not with others or if you would like to grant various levels of access to a diverse range of users.
- Public folder sharing offers a very convenient and logical way to designate a collection of documents, pictures, music, and other files that you would like to share with all those that make use of the computer or your network.

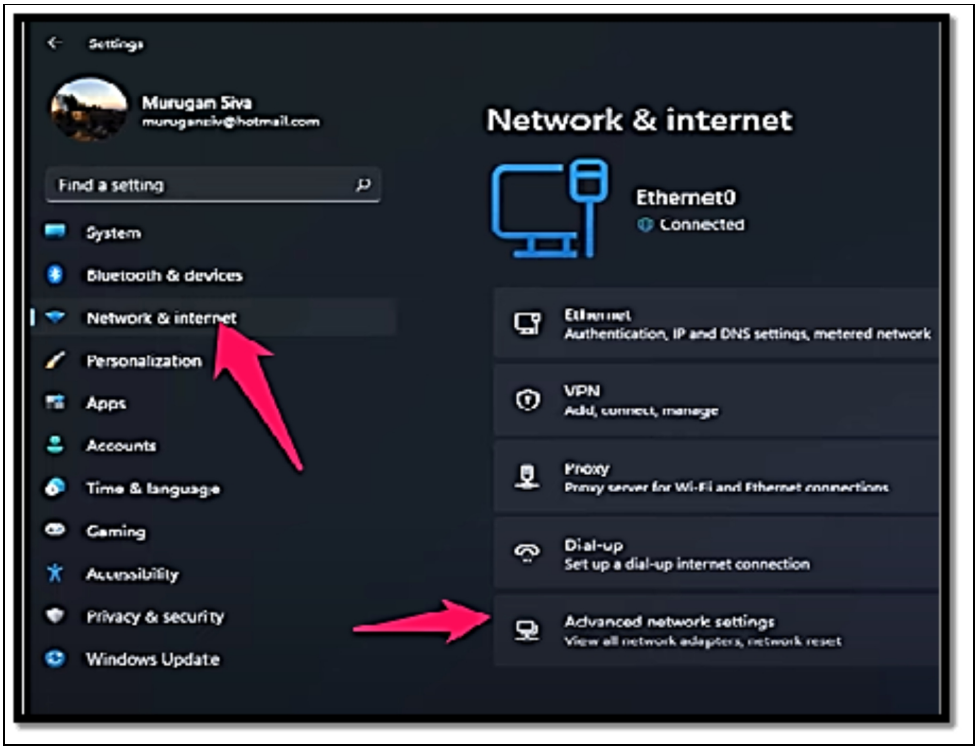
## Configuring your network for sharing

You must make certain preparations if you intend to share folders and files with other network users. (You can skip these steps if you just intend to share with people who check in locally to your computer. Additionally, if your machine is a member of a domain, an administrator on the domain controller must do some of these steps —or their counterpart in the domain world.

- Ensure that all computers make use of the same workgroup name. With the use of modern versions of Windows, this step is not really needed, although it does improve network discovery performance.
- Set the location of your network to private. With this setting, it will be quite possible for other users to find shared resources and also offer appropriate security for a network in a home or an office.
- Confirm that network discovery is switched on. This ought to happen instantly when you configure the network location to Private, but you can check the setting twice and modify it if need be in Advanced Sharing Settings.

**In order to open Advanced Sharing Settings,**

  - Navigate to **Settings > Network & Internet > Advanced Network Settings**. Once done, you can then choose Advanced Sharing Settings.




- Choose your sharing options: In advanced sharing settings, you are free to make a selection for each of the following network options. The first option is beneath the Private profile; to see the remaining settings, you will need to expand All Networks.
  - **File and Printer Sharing**: Switch this option on if you would like to share certain files or folders, the public folders, or printers; must be switched on if you have any plan to share any files over your network. The mere act of switching on file and printer sharing will not show any of the files on your computer or printers to other network users; this will only happen after you have made additional settings.
  - **Public folder sharing**: If there is a need for you to share items in your public folder with all network users (or, if you enable password-protected sharing, all users who have a user account and password on your computer), switch on Public folder sharing. If you get this done, network users will have read/write access to Public folders. With Public folder sharing switched on, anyone who signs in to your computer locally will

have instant access to the public folder but network users do not have this access.

- **File Sharing Connections**: Ensure this option is configured to 128-bit encryption, which has been the standard for a very long time.
- **Password Protected Sharing**: When password-protected sharing is switched on, users of the network will be unable to gain access to your shared folders which also includes public folders if shared; neither will they also be able to gain access to printers unless they can insert the username and password of a user account on your computer. Once this setting is enabled, when another user makes an attempt to gain access to a shared resource, Windows will send the username and password that the person used to sign in to their own computer. If that becomes a match to the credentials for a local user account on your computer, the user will then get immediate access to the shared resource. If either the username or the password is not a match, Windows will request that the user provide credentials.

Windows does not request a username and password from network visitors when password-protected sharing is off. Instead, the Guest account is used to grant network access. It's crucial to remember that Windows 11 by default disables the guest account. This implies that a user still needs a functioning user account to connect to your shared resources, even if you disable the necessity for password-protected sharing. You can enable the Guest account on your computer, but we highly advise against doing so because it poses a serious security risk.

- **Configure user accounts**: If you make use of password-protected sharing, each person who gets access to a shared resource on your computer must have a user account on your computer. If you make use of a Microsoft account, ensure the account is added to both computers; for a local account, be sure that the username and password are identical on both machines. If you have configured the account properly, network users will be able to gain access to shared resources

without the need to insert their credentials after they have signed into their own computers.

## Shared files and folders

As long as the Sharing Wizard is turned on, the procedure for setting up shared resources is the same whether you choose to share files and folders with individuals who use your computer or those who connect to it over a network (or both). Even if you generally detest wizards, we advise you to use the Sharing Wizard. Making all the appropriate settings for network shares and NTFS rights is quick, simple, and certain—a sometimes-daunting procedure if done manually. If necessary, you can always dig in and make manual modifications after the wizard configures shares. To be absolutely sure that the Sharing Wizard is enabled, open File Explorer Options. In the dialog that shows, choose the **View tab.** Close to the bottom of the Advanced Settings list, verify that the Use Sharing Wizard is chosen.

**Once you are sure that the Sharing Wizard is set, follow the steps below to share a folder or files;**

- In File Explorer, choose the **folders or files you would like to share**.
- Right-click the folders and choose **Show More Options**. Then choose **Give Access To > Specific People**. The Network Access dialog will then be shown.
- Select **in the text box and insert the name or Microsoft account** for each user with those who would like to share. You can also choose to insert a name in the box or choose the arrow to show a list of available names; then choose Add. Take this step once more for each of the people you would like to add. You can choose to add any user accounts on your computer, and also groups.
- For each of the users, choose a permission level.
  **The various choices you have include;**
  - **Read**: Users with this level of access can run shared programs and view shared files, but they are not allowed to

edit or remove any files. Setting the NTFS permissions to Read & Execute is the same as choosing Read in the Sharing Wizard.

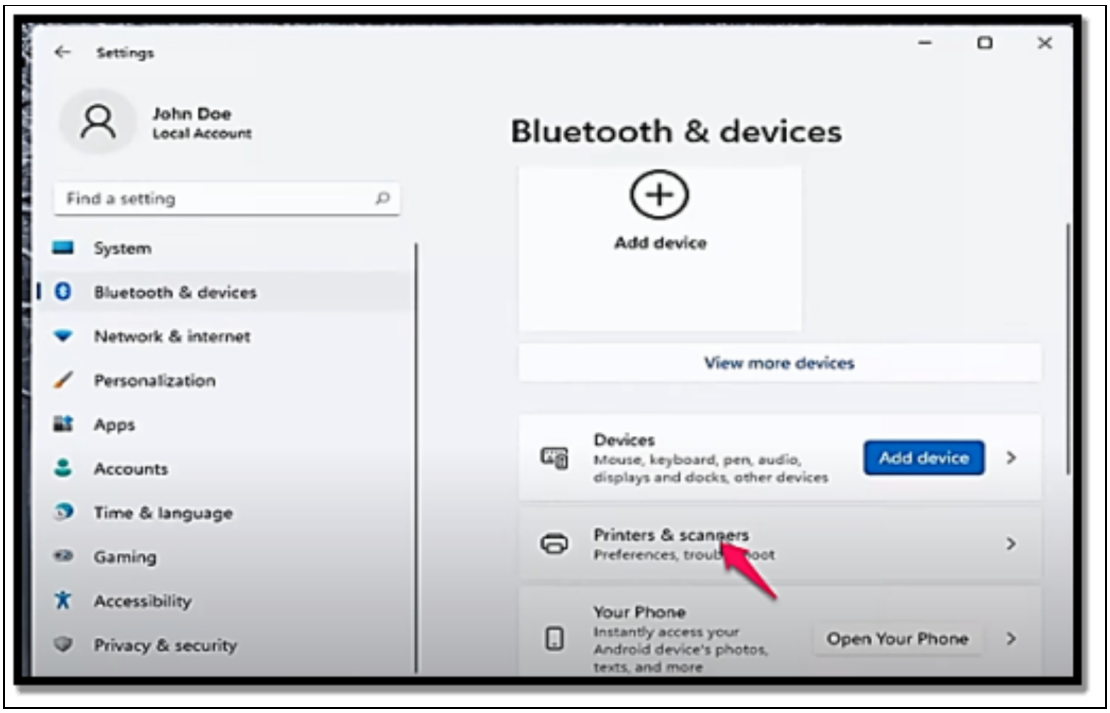
- **Read/Write**: Users with the Read/Write permission are granted the same rights as the folder's owner, including the ability to view, edit, add, and delete files. The NTFS permissions for this user are set to Full Control when Read/Write is chosen.

- Choose **Share**. After some time, the wizard will show a page where you can make more settings.
- In the last step of the wizard, you can choose to get any of the following done;
  - People you are sharing with will receive an email from you. There is a link to the shared objects in the message.
  - The network path should be copied to the clipboard. If you wish to transmit a link through another program, such as a messaging app, this is useful. (Right-click the share name and select **Copy Link from the menu** to copy the link for one specific item in a list.)
  - Click **twice on the name to have a shared item opened**
  - Open **File Explorer** to display each network share on your computer with your machine selected in the Network folder.

## Sharing a printer

Windows doesn't offer a wizard for network printer sharing, but the procedure is still quite straightforward. Whether a printer is shared or not, you may configure all of its settings using its properties dialog, which is accessible under

- **Settings > Bluetooth & Devices > Printers & Scanners.**




- Select a **printer, and then click Printer Properties** to make it accessible to other network users. Choose **Share This Printer under the Sharing option**, and then provide a share name.

A single set of permissions governs access to printers, regardless of whether it is granted to network users or local users, unlike shared files, which keep separate share permissions and NTFS permissions. (Of course, network users can only access printers that have been shared.) When you set up a printer, all users in the Everyone group initially have the ability to print any documents they create. This gives users access to the printer and gives them control over their own documents in the print queue. Members of the Administrators group also by default possess the Manage Documents permission, which enables them to pause, restart, move, and delete all queued documents, as well as the Manage Printers permission, which enables them to share, modify, remove, and alter the properties of printers. On the Security tab of the printer properties dialog, an administrator can view or change permissions.

## Setting print server properties

You can configure additional properties by going to the Print Server Properties dialog in addition to configuring them for individual printers using their respective properties dialogs.

- Open **Settings > Bluetooth & Devices > Printers & Scanners to get there**.
- Click **Print Server Properties after that under Related Settings.**

**The list of items you see in a printer's properties window is controlled by the first three tabs:**

- The Forms tab controls the list of forms you can assign to trays making use of the Device Settings tab in a printer's properties dialog. You are free to design new form definitions and delete any you designed, but you are unable to delete any of the predefined forms.
- On the Ports tab, you can also choose to configure the ports that show on the Ports tab in a printer properties dialog.
- The Drivers tab offers a list of all the installed printer drivers and offers a centralized location where you can choose to add, remove, or even update drivers.

You can define the location of spool files on the Advanced tab. (If, for instance, you frequently run out of capacity on the current drive when you try to print large documents, you might wish to switch to a folder on a separate drive.) On this menu, you may also configure notification settings. A tool that consolidates all print management duties into a single useful console is available to users of Windows 11 Pro and Enterprise editions. Printers, drivers, queues, and shares may all be managed via Print Management (Printmanagement. msc). In the search box, enter "print," and then select "Print Management" to launch it if it's part of your edition.

# Activity

1. Connect your system to a Wi-Fi network.
2. Configure your VPN
3. Share files from your system to another system.

# CHAPTER 17
# PERFORMANCE OPTIMIZATION

It is true that sheer speed can increase productivity, particularly for tasks like editing and converting large video files, which can take only a few minutes on a high-powered workstation but an hour or longer on a low-end laptop. Even after the workday is finished, having a fast PC can add a little more enjoyment to life. Just ask any dedicated gamer how much time they have devoted to frame rate mania.

**But let's face it:** When it comes to accelerating processes, Windows frequently acts as an innocent spectator. If the hardware you're using is up to the task you're asking it to complete, the performance of a PC running Windows 11 out of the box should be adequate. A low-power mobile processor on a cheap laptop will almost surely have trouble with a CPU-intensive task, like processing videos, for example. However, even a workstation-class PC might perform poorly if a significant subsystem is malfunctioning or Windows is improperly set up.

## What often causes performance problems?

Anytime people complain that their Windows PC is becoming sluggish, they are often expressing frustration over the need to wait for a long period of time before they can access files on their computer.

**If a task is taking longer than expected, the cause of that poor performance is often one of the following factors;**

- **Inadequate hardware resources**: Microsoft's high compatibility requirements for Windows 11 PCs ought to ensure that there is a baseline performance that is acceptable. Nevertheless, more demanding tasks like digital media encoding can push certain systems to the breaking point. The performance-monitoring tool ought to help with the

identification of the areas where hardware components are being overused.

- **Defective hardware**: Memory and disk errors are often obvious when they cause a system to crash, but hardware-related problems can also lead to a drag in performance. Check with the manufacturer of your hardware to see the diagnostic tools that are available for use.
- **Outdated or flawed device drivers**: PC and device makers have the sole responsibility of supplying individual hardware components that go into their hardware. If you usually have a clean install, Windows may install a generic driver as against one that is specifically written for that device. Most problems with performance leave once a simple driver upgrade has been conducted.
- **Out-of-control process or services**: Occasionally, a software or background process that usually functions flawlessly will spiral out of control and use up all available CPU time, memory, or other system resources. Naturally, all other duties are performed slowly or cease altogether. A crucial troubleshooting skill is the ability to recognize and terminate this kind of process or service and stop it from happening again.
- **Malware**: Viruses, Trojan-horse programs, spyware, and any other form of unwanted software can cause harm to the system performance. Ensure you check for the possibility that malware is present on a system that shows some performance problems that cannot be explained.

## Speeding Up Startup and Shutdown

Windows 11, Microsoft's most recent operating system offers a number of fresh features and programs. Windows 11 will eventually experience issues including a slow startup, a delayed shutdown, and a slow reaction time, just like previous operating systems. If you're bothered by these issues, keep reading. This post tries to teach readers how to increase Windows 11's startup and shutdown speeds. To solve your problem, you can attempt one or more of these approaches.

## Replace HDD with SSD

If your hard disk is an HDD, it is advised that you replace it with a suitable SSD. SSD has a much faster memory known as flash memory which is not only great at enhancing the speed of start-up and shut-down but it can also help to increase the performance of your device. The only major problem that can be attached to this is the fact that SSD is quite expensive than HDD. It costs about three times more than HDDs. Nevertheless, if possible, make use of SSD. It will surely help you get over the slow and sluggish startup and shutdown problems.

## Disable unneeded startup programs and services

If you are the type who likes to run so many applications and have so many installed in the Windows 11 startup folder, some of the installed software initiate themselves by default when you start up your system, which will also take more time to get Windows started. To disable such software and applications is of immense benefit to increasing the speed of your system.

- Tap **the Ctrl + Shift + Esc keys** together in order to open the Task Manager Dialog box. Once done, choose **Startup** from the tab then choose the programs you have no need for, and choose Disable.

You can stop the unwanted services that slow down your computer's performance to improve the startup and shutdown times of Windows 11. Open the services app by performing a Start menu search for services. Double-click the service you wish to turn off after choosing it in the Services box.

## Avoid installing too many programs on the system partition

A smart technique to increase the performance of your system is to remove any applications that are useless or that you don't use. To access the Control Panel, type Control Panel into the Start menu.

Then pick Uninstall by right-clicking the program's name after clicking Uninstall a Program.

## Ensure that your C drive has enough free space, 20GB or more

In the same way your house needs to be cleaned almost every time and made tidy also, your C drive also needs to be optimized from time to time.

**Below are two ways you can get this done;**

- **DIY (Do It Yourself)**: Here, all you need to do is type Disk Cleanup in the Start Menu in order to open the Disk Cleanup tool. Then choose the drive that you would like to clean to commence the process.
- **Third-party Software**: You can also choose to make use of third-party software to clean up your system. The software will remove the temporary, old, and empty junk files from your hard drive and it will then free up more space on the system drive.

## Use Efficiency Mode

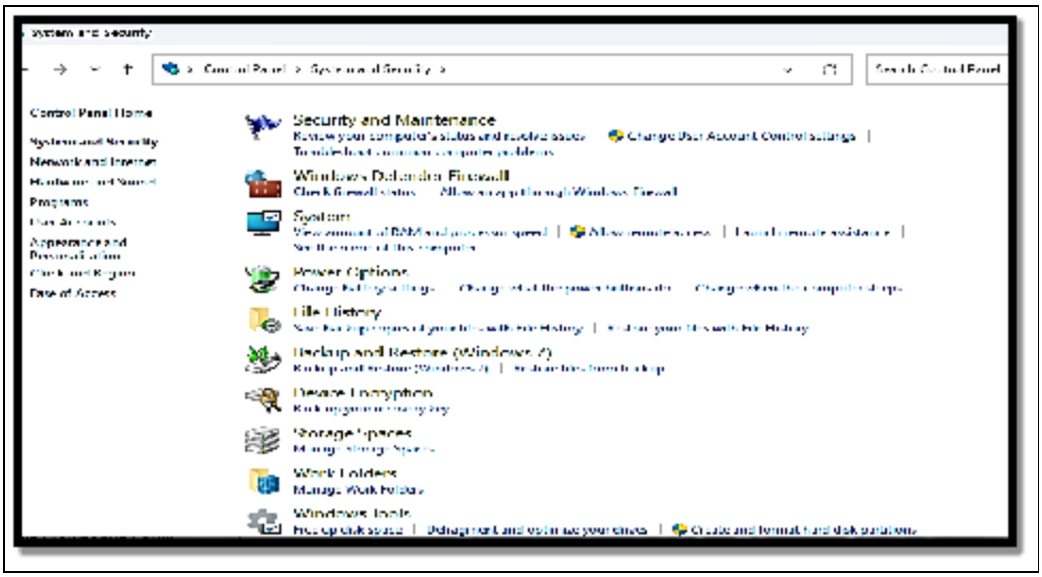
Another trick Task Manager has up its sleeve will boost Windows 11 performance. Efficiency Mode, which was included in Windows 11 22H2, helps speed up your computer and lengthens the life of your laptop battery. Among other efficiency tips, it lowers the process priority of background apps. Since you can't put your entire PC into Efficiency Mode, the name is a little misleading. Instead, you add specific apps and processes to it using Task Manager. There is one restriction: You can only use it with specific programs and operations. First open Task Manager and if you are already in Task Manager, choose the Processes icon on the left side of the screen to get to the Process screen. A list of applications that are running and being processed will then be displayed. Choose the app or process you would like to place in Efficiency Mode, choose the Efficiency Mode icon that is located at the top right of the screen, and then confirm that you would like to switch on Efficiency Mode for the app. It is worth noting that if the Efficiency mode icon is grayed out

anytime you choose an app or process, you will be unable to make use of it. Also note that some apps like Microsoft Edge, work instantly in Efficiency Mode by default, and you are unable to turn this mode off.

## Use automatic Windows Maintenance

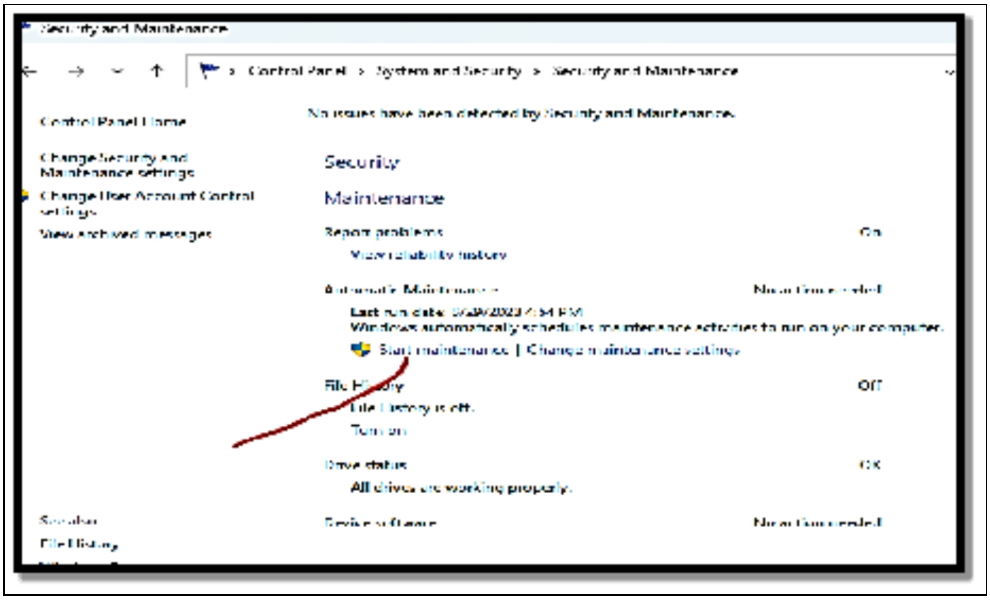
In the background, Windows 11 helps to conduct maintenance on your PC, getting things like security scanning and performance system diagnostics done in order to ensure that all is running smoothly. It instantly locates the problem and fixes it which in turn ensures that your PC runs at peak performance. The automatic maintenance runs daily at 2:00 a.m. if your device is plugged into a power source and is asleep. However, if you power down your PC at night (rather than putting it in Sleep mode), or if you haven't had your laptop plugged in for a while, that capability may have been inadvertently disabled or it may not have recently been used. Make sure it is always running and turned on. If you'd prefer, you may also execute it manually. To launch the Control Panel app, click **the search icon on the taskbar,** enter control in the search box, and then choose **Control Panel** from the list of results.

- Choose **System and Security > Security and Maintenance in the app**.



**If you want the automatic maintenance to run right now, go to the**

- Maintenance section and select **Start Maintenance**. Select the time you'd like maintenance to run and check the box next to Allow scheduled maintenance to wake up my computer at the scheduled time on the screen that displays after clicking Change maintenance settings to make sure it runs every day. Then press **OK.**




## Change your power settings

Your Windows 11 PC's power settings enable you to balance its energy usage with its performance. It is therefore advisable to bear in mind that if you are making use of Windows 1's Power saver plans, you are slowing down your PC. The plan brings about the reduction of the performance of your PC in order to save energy. Changing your power plan from Power Saver to High Performance" or balanced will provide you with an instant performance boost.

- Start by **typing control into the search box** and selecting the **Control Panel icon to open the Control Panel app**
- Select **Hardware and Sound**

**Power Options** after that. The two choices are usually "Balanced (recommended)" and "Power saver." You might also see alternative plans here, some of which are branded by the manufacturer, depending on your make and model. Select **"High performance"** by clicking the downward pointing arrow next to "**Show additional plans**." Make a choice of the setting you would like to make use of and then leave the Control Panel. High performance offers you the most oomph but also makes use of the most power. Balanced helps with the provision of a basic medium between power use and better performance while Power Saver does all it can to ensure it gives you as much battery life as needed.

Establish the practice of closing all open applications before turning off your device. Because programs are active when you try to shut down Windows, it will take some time for your computer to execute all the tasks. Additionally, remember to restart your computer occasionally so that you can clear its memory and end any running activities that might be slowing it down.

## Managing Background Apps

On your Windows 11 PC, a number of the installed apps will continue to operate in the background even after you close them. Running applications like Teams or Outlook, for instance, is crucial as you receive fresh updates. However, using too many programs in the background can affect battery life, connectivity, and speed. The good news is that there are various ways to stop background

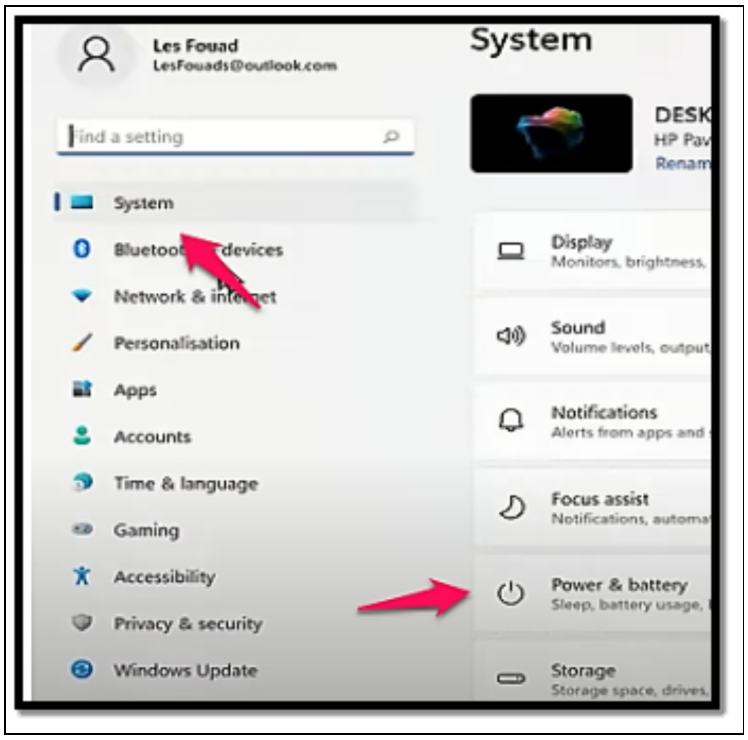
programs on Windows 11 and boost overall efficiency. You may disable them using Group Policy, the Power and Battery settings, or the Settings app.

**Follow the steps below to make use of the Settings app to disable background apps running on Windows 11;**

- Tap the **Windows key to open the Start menu and open Settings**. As an alternative, you can choose to make use of the **Windows key + I keyboard shortcut** to have it opened directly.
- When the Settings app opens, choose **Apps** from the left side and then choose Installed Apps on the right.
- Find the app you would like to prevent from running in the background or navigate through the list of applications to locate it.
- Choose **the three-dot button** close to the name of the app and choose **advanced options from the menu.**
- Move down and locate the **Background app permissions**.
- From the Let this app run in the background section, choose the **Never option from the menu.**

**To have a wider range, you can choose to make use of the Power & battery to get this done;**

- Tap the **Windows key and open Settings from the Start menu**.
- Choose the **System tab from the left column**.
- Navigate down, choose the **Power & Battery section**




- And expand the **Battery usage section.**
- Choose the **Background option** from the **Sort by dropdown menu close to the Search field.**
- Windows will then sort your apps by background usage. Choose **the three-dot button close to the app and choose the Manage background activity option.**

- Beneath the **Background permissions section**, choose **the dropdown menu and choose the Never option.**

On Windows 11, you have control over the connectivity, performance, and battery life of background apps by disabling them. Disabling apps is also a big advantage if you have a metered connection. Furthermore, you should be aware that some Win32 desktop applications provide you the option to control whether they operate in the background. You can seek the option in the settings of the particular app because each one differs. There are other options available for managing programs on Windows. For faster boot times, you can choose to disable startup apps or set apps to open automatically. It's a good idea to delete apps on Windows 11 if you no longer require them. You may configure Windows 11 to only allow the installation of programs from the Microsoft Store if you are an administrator.

## Monitoring System Resources

Many monitoring applications, including Task Manager, Performance Monitor, and Services, are included with Windows. The Resource Monitor program is also included with the Windows operating system, but many people are unaware of this. This app can be launched either independently or through the Performance Monitor app. This utility will display the resource utilization of different computer components in real-time. In order to improve system performance, you can also identify and terminate high-resource-using processes and services.

## Resource Monitor App

Using Windows Search is a simple method for launching the application. Type "resource" into the search field after clicking the lens icon on the taskbar.

**The Resource Monitor application will appear in the search results;**

- Click the **"Run as administrator" or "Open" link to start the application.**

You can also access the app through the Performance Monitor app. Search for and launch the Performance Monitor app first.

- Click the **"Performance" heading** in the left sidebar after the program is open. A link to "**Open Resource Monitor"** will now appear on the right pane. To open the Resource Monitor app, click the link.

## Viewing Overall System Resource Usage

Your computer's resource utilization will be displayed by the software under the CPU, Memory, Disk, and Network categories. You can click on individual tabs under the "Overview" tab or select the tabs shown beneath the menu to view the respective parts. The overview area is a nice method to understand the resource utilization in your system, as you can see in the screenshot below. To see all real-time usages together on one screen, you can collapse all the sections. The right sidebar also has visual representations of each component. The sidebar can be expanded or collapsed as needed. To alter the size of the graph, select small, medium, or big from the "View" dropdown menu that appears above the graphs.

## Analyzing CPU Usage

All of the processes and services that are available on your system, along with any related handles or modules, are displayed in the CPU area. The real-time CPU utilization will be displayed in the title bar of the "Processes" and "Services" sections.

- To arrange the list, expand the **"Processes" section and select the "Status" column**. You can access the operating status of every process from here to learn how each one affects CPU consumption in real-time. To see the effects of each specific service operating in your system, you may similarly do this for services.

## Keep in mind that the tool has several hidden columns.

- Select **Columns** from the menu by performing a right-click on any section's header row. This will display a list of every column that is accessible for that section. Change the layout by checking or unchecking the necessary boxes and clicking the **"OK" button.**

The CPU column displays current consumption, whereas the Average CPU displays consumption over the previous 60 seconds. These details can be used to identify the services or processes consuming a lot of CPU. Simply right-click on a process and choose "End Process" to terminate it.

## Checking Memory Usage

Process and Physical Memory are the two sections found on the Memory tab. The title bar for the "Process" section displays the current percentage of physical memory consumption. You can find the amount of memory used by each process that is active on your system under this section. Understanding the significance of each column is crucial since different types of memory are consumed by each process. The best method to see the tooltip and comprehend it is to hover over the header row.

**Here is a brief synopsis:**

- Working Set (KB) is the amount of physical memory that is being used by the process.
- Private (KB) is the physical memory that is used by the process and cannot be shared.
- Shareable (KB) is the physical memory used but can also be shared with other processes.
- Commit (KB) is the virtual memory allocated by the system for that same process.

You may find information about the used and available physical memory in MB with a nice graphical depiction under the "Physical Memory" section. To sort and identify processes that use a lot of memory, click on the "Working Set (KB)" column header. To end a

process and release the RAM it has taken up, right-click on it and chooses "End Process".

## Checking Disk Usage

Processes requiring disk activity, actual disk activity, and storage details are displayed in the disk section's three subsections. By selecting "End Process" from the context menu when right-clicking, you may identify which process is taking a lot of disk space and end it.

## Analyzing Network Usage

You may view processes using the network, actual network activity, processes using TCP connections, and processes listening on ports under the "Network" tab. The section under "Processes with Network Activity" lists the processes together with the total amount of bytes delivered and received. To find the processes using most of the network, sort the processes based on the total column. These details can be used to identify and stop the processes that are slowing down your internet connection. The "Network" section's sidebar graphs will display information about each network, including TCP connections, LAN, ethernet, Wi-Fi, and Bluetooth. A cool app to track system performance based on CPU, disk, network, and memory utilization is Resource Monitor. The tool can help you identify which tasks are using more resources than others. Similar to Task Manager, the Resource Monitor program lets you right-click and choose **"End Process"** to end any active processes. To enhance system performance, you can also disable CPU-intensive services.

## Overclocking and Hardware Tuning

Overclocking in basic terms enables computer hardware to run at speeds that are much faster than what was actually intended by the manufacturer. Once overclocked, the central processing unit (CPU) of the computer can get more tasks done at once, render media much faster, or show video games at a much higher frame rate. Almost every computer processor be it a CPU or GPU (graphics

processing unit) has its basic speed rating. This rating can be described as a multiple of the clock speed usually measured as the frequency in hertz. The clock speed of any CPU is usually managed by its controller software known as the BIOS. The clock speed will then measure the number of cycles a CPU can take per second, measured in Gigahertz, or billions of cycles per second. In 2021, consumer processors can often be found running between 2 and 5 gigahertz speeds. Much older CPUs are also measured in megahertz, or millions of cycles per second.

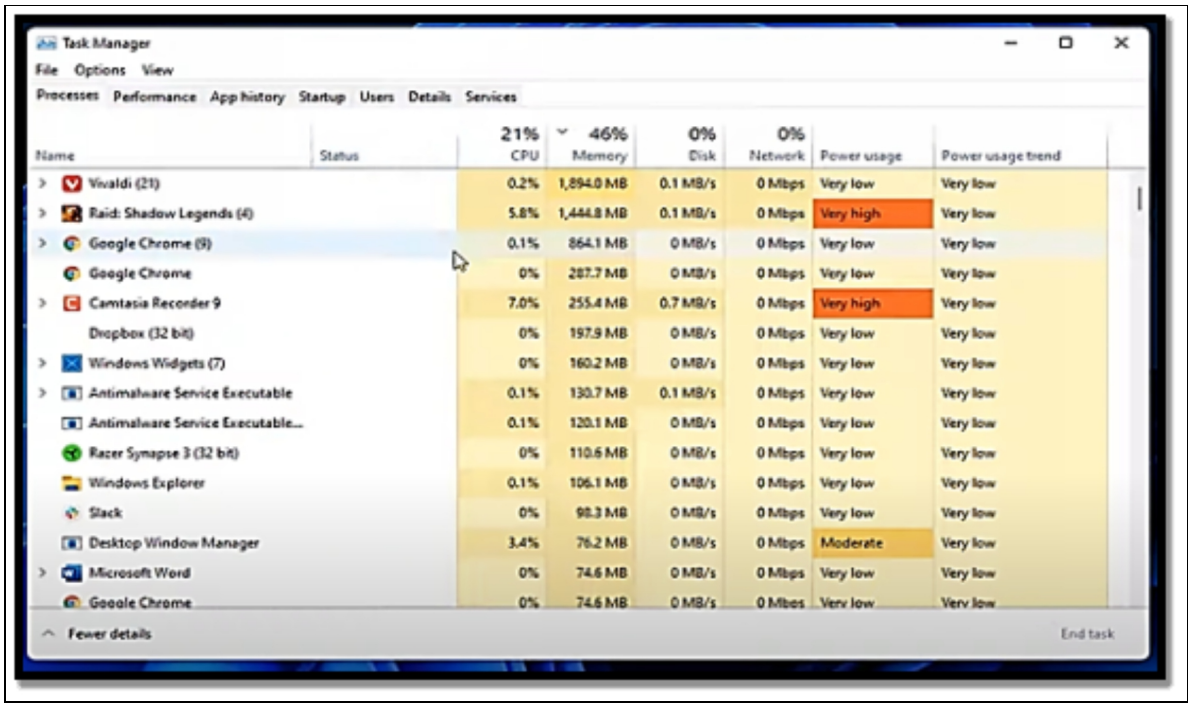
Since silicon fabrication still prevents two examples of the same processor from being completely identical to one another, speed ratings are typically conservatively established by these businesses. A single assembly line's products will all have slightly varied capabilities due to minute flaws. Each core in a multi-core CPU exhibits these differences as well. In order to maintain uniformity across product lines, chipmakers will therefore understate performance metrics. Although the BIOS of these processors conceal their true performance threshold, overclocking allows access to it. When the CPU of a computer is overclocked, it enables it to go beyond the factory speed limitations and also empowers it to complete tasks faster than it would normally have. Other types of hardware like GPUs and RAM can also be overlooked for much greater boosts in performance.

**Note:** Turbo Boost on Intel processors and Turbo Core on AMD processors are more user-friendly alternatives to overclocking that have been provided by CPU manufacturers. There are many similarities between these two functions. Both enable the CPU to operate faster than its base frequency for brief periods of time while continuously keeping an eye on power and temperature to ensure reliability. Turbo features aren't regarded by the chipmakers as overclocking because they are entirely automatic and turned on by default, thus they won't affect a warranty.

## Enabling Overclocking

The first thing you need to do is to check if your processor can actually be overclocked. Most consumer-grade chips, most especially those that are in laptops, have these features locked away completely. You can check the exact model of your CPU in Windows by

- opening the **Task Manager (CTRL +SHIFT + ESC)**, selecting the **Performance tab,**



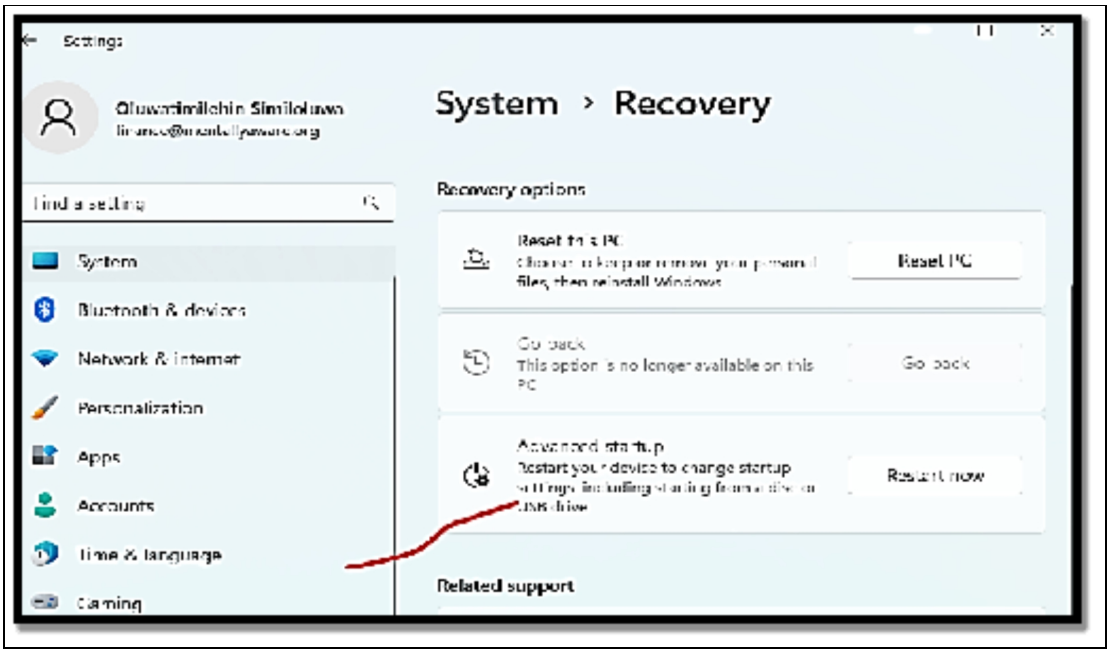

**And locating it listed just beneath the CPU section**. The website of the manufacturer will most likely be the very best place to locate the exact specs and features of the component. Upon the confirmation that the chip can be overclocked, there are a few things to be done to get this enabled in your operating system. The old way to get this done is going through BIOS, but there are now various software from Intel and AMD, that can help with the control of a compatible CPU from the desktop. They also handily help with the monitoring of the clock speed, power consumption, and also the device temperature. For Intel, you can make use of Extreme Tuning Utility (XTU) and for AMD it is Ryzen Master Utility. If you would prefer to go the old way by booting your PC into the BIOS menu, you can get this done in Windows 11 by simply tapping Escape

immediately after you start the computer then you will tap the F10 button to get into BIOS.

**If your system boots up really fast you can then follow the method below;**

- Navigate to **Settings in the Start panel.**
- Choose **System > Recovery**

## Advanced Startup




## Restart Now.

- Once your computer restarts, you will be faced with a special boot menu.
- Choose **Troubleshoot > Advanced Options > UEFI Firmware Settings > Confirm Restart.**
- This will then open your **BIOS**.
- Switch over the CPU section of the BIOS. Choose an option known as Processor Settings, Overclocking, or OC.

In either the BIOS or your software client, there will be two important configurations; CPU Multiplier and CPU Voltage. The virtual "clock" that your processor syncs to is called the CPU Multiplier. It is most likely set by default to 100 megahertz. Once the boot procedure is complete, increase that to 200 megahertz and start overclocking. You might think about increasing clock speed by additional 100 megahertz increments once you've made sure the system is operating steadily. To ensure stability at any configuration, Intel's XTU offers benchmarking and stress testing applications. Throughout the process, keep a close check on the system temperatures. It's likely time to reduce speed or begin replacing fans if you see that your CPU is running above 175 degrees Fahrenheit (80 degrees C).

CPU voltage controls the amount of electricity that goes into the CPU and will be configured around 1.25 volts by default. For beginners, it is usually recommended that these settings be left untouched due to the fact that an increased voltage can easily lead to an overheating system. For most chips, when they draw beyond 1.5 volts, it can lead to permanent damage; hence a little adjustment will go a very long way. Nevertheless, with proper cooling and power supply upgrades, a voltage can be increased in .05 volt increments for more performance improvement.

## Activity

1. How can you speed up the startup and shutdown of your system?
2. Managing the background applications on your system.
3. Monitor your system resources.
4. How can you overclock your system?

# CHAPTER 18
# ADVANCED TROUBLESHOOTING

Advanced troubleshooting can simply be referred to as a set of more complex as well as specialized techniques that are used in the diagnosing and resolving of various issues that exceed basic problem-solving methods. It also involves going deeper into the operating system and its components so as to locate the root cause of problems that may be affecting the stability of the system, performance as well and functionality. There is a need to have a perfect understanding of Windows internal and technical skills before making an attempt at advanced troubleshooting. In this chapter, you will learn about some of the various advanced troubleshooting that you can carry out on your Windows 11.

## Using Windows Performance Analyzer

The primary task of the Windows Performance Analyzer software is to track log events, typically for troubleshooting purposes. To help users find potential problems, the application generates the event trace log report table and graphical visualizations. Therefore, it offers the essential information and guarantees that any user may comfortably prevent the recurrence of harmful system errors. Event trace logs are typically recorded using Windows Performance Recorder or another program. This is a generic component of the Windows Assessment and Deployment Kit application, sometimes known as Windows ADK. Windows performance analyzer has quite an extraordinary UI that provides one-shot access to programs such as Diagnostic Console, Graph Explorer, Issues Window, Analysis Tab, and lots more. The program is specifically useful when having to analyze the Operating system of your machine. You can easily check the status of the memory, power source stability, and system activity log hence you can acquire information about the aspect of your Windows that is not well secured.

**To make use of Windows Performance Analyzer, follow the steps below;**

- Download Windows **Performance Analyzer from Microsoft Store**.
- Open a trace file. Once done, events will be categorized in Graph Explorer on the left, and the analysis assistant will then be opened on the right. The analysis tab is in the middle.
- Configure symbols; click on **File > Configure Symbols** in order to gain control of the various processes and images that have symbols. Note that symbols must be loaded in a correct manner for all the data to be displayed in the Analysis tab. Select **File > Load after the settings have been configured.**
- Appl a profile; select **File > Apply Profile > Catalog**, and then choose a profile that is quite applicable to your very analysis.
- Include graphs in your Analysis tab. Move a graph to the Analysis tan to commence your performance analysis. You can also choose to click twice on a graph to include it in the Analysis tab.

Below are some basic actions that can be performed with the use of the performance analysis.

## Use the Analysis Assistant

The profile, tab, graph, and preset information provided by Analysis Assistant are helpful. The Analysis Assistant displays details about the chosen graph or data table when you select one of them. This will serve as a guide for your analysis.

## Highlighting a time interval

Select a time interval on the graph where system behavior suggests a potential performance issue, such as high CPU consumption, and click and drag the mouse pointer over that area. Your choice will sync the data in the table.

## Zoom, Search, and Filter

- In the Data table, choose and right-click o**n a row to filter the data** that is shown in the table. Choose an area in the graph and then right-click and choose Zoom.
- Touch **Ctrl +F to find data.**

## Viewing Data

## Graphs

Graphs are the main way to visualize the data that has been recorded. The style of the graph is based on the type of data in use.

## Data Tables

The date from your trace log file can also be made available in a tabular form in the data table. It is divided into three key aspects; keys, data, and graphing.

## Customization

You can do any data table, any right-clicking on the columns, and the addition of more columns. Anytime columns are included, save the changes in order to enable a much faster repeat analysis.

## Command Prompt and PowerShell Tricks

Windows Terminal, an updated console software, is included with Windows 11. It is a packaged software that can be used with PowerShell, Command Prompt, or Azure Cloud Shell to access a command line interface. Users still favor Command Prompt over PowerShell or Terminal because it is more convenient for them historically. Listed below are some tips to increase your productivity if you enjoy using Command Prompt. While some of these Command Prompt tricks are unique functions or entertaining applications of the Command Prompt itself, others are just cool or uncommon things you can do with specific CMD commands.

## Use Ctrl + C to Abort a Command

With the use of the abort command (Ctrl + C), you can stop just about any command. If a command has not been executed yet, you can choose to backspace and also erase what you must have typed but if you have already executed it then you can make use of the Ctrl + C to put an end to it. Nevertheless, for certain things like the dir command that looks as though it is going on forever or questions that you may be asked at the prompt that you do not have the answer to, the abort command is quite a unique Command Prompt trick to have a knowledge of.

## View a Command's Results One Page (or Line) at a Time

Have you ever used a command that displays so much data on the screen, like the dir command, that it is practically useless? One technique to handle this information dump is to run the command in a particular way such that the output is displayed on one page or one line at a time. Simply enter the command, the pipe character, and the more commands after it. For instance, running the command below would produce the tens of thousands of lines of output that you would anticipate from the dir command, but running the more command will stop each page of output and display -- More -- at the bottom of each page to indicate that the command is still in progress.

## Run Command Prompt as an Administrator Automatically

Most commands have a need that you open an elevated Command Prompt in Windows; in other words, run them from a Command Prompt that runs as an administrator. You are free to always right-click any Command Prompt shortcut and select Run as Administrator, but creating a shortcut to do the same thing can be a huge time saver if you are a frequent Command Prompt power user.

If you would like to complete this trick, just design a Command Prompt shortcut on the desktop, insert the properties of the shortcut, and then choose the Run as administrator box, located in the advanced button in the Shortcut tab.  If you make use of Command

Prompt through Terminal, configuring an admin access is much easier; Open Terminal's settings to the Defaults page, and allow run this profile as Administrator.

## Become a Command Prompt Power User with Function Keys

**The fact that the function keys actually do something in the Command Prompt is maybe one of the very best-kept secrets about the tool;**

- **F1**: helps to paste the last executed command (character by character)
- **F2**: pastes the last executed command (up to the entered character)
- **F3:** pastes the last executed command
- **F4:** deletes current prompt text up to the entered character.
- **F5:** pastes recently executed commands.
- **F6**: pastes Z to the prompt.
- **F7**: shows a selectable list of previously executed commands.
- **F8**: pastes recently executed commands (cycles).
- **F9**: request for the number of the command from the F7 list in order to paste.

## Change the Prompt Text

You can change the prompt's text from C:> to whatever text you like, have it display the time, the drive that is now selected, the Windows version (as in this example image), or anything else you desire. One helpful example is the prompt $m$p$g, which displays both the drive letter and the complete path of a mapped drive. You can always run the prompt by itself, without any settings, to go back to its somewhat dull default.

## Save a Command's Output to a File

The usage of redirection operators, notably t**he > and >> operators**, is a remarkably helpful Command Prompt tip. These tiny letters enable you to save a copy of the data that a command created in the

Command Prompt window by rerouting its output to a text file. Let's take the scenario where you are preparing to report a computer issue on an internet forum and you want to be really exact about your PC. Utilizing the system info command with a redirection operator would be a simple method to achieve that.

## View a Drive's Entire Directory Structure

The tree command is among the cutest minor commands. You may use a tree to make a kind of directory map of all the drives on your computer. To view the folder structure underneath a directory, run the tree from any directory. It's usually a good idea to export the findings to a file so you can actually sift at the vast amount of data produced by this program.

## Copy Text from the Command Prompt

Having to copy lots of text from the Command Prompt is not quite as easy as copying from other programs which is part of the reason why having to save a command's output file comes in handy.

**Nevertheless, if all you want to do is just copy a short section of text to the clipboard, this is not so hard; follow the steps below;**

- Right-click anywhere in the **Command prompts windows and click on Mark.**
- Highlight with the use of your left mouse button just what you would like to copy.
- Tap **Enter or right-click once.**

That is the menu-based approach, but interestingly, the standard Ctrl+C shortcut is also an option. If you choose to mark anything but then change your mind, right-click again to undo the mark operation or press **the Esc key**. You can now paste the data wherever you want, just like you can paste other text.

## Open the Command Prompt from any Location

If you've ever spent a lot of time working in the Command Prompt, you know how annoying it can be to repeatedly run the cd/chdir

command to find the correct directory. Open the folder you want to work from in Windows. When you get there, click anywhere in the folder while holding down Shift. You'll see an entry after the menu appears that isn't often there: Open this in a command window or in the Terminal (Windows 11). When you choose that, a fresh instance of the command line will launch and be waiting where it should be. Power users of the Command Prompt will instantly see the benefit of this small tip.

## Diagnosing Hardware and Driver Issues

The process of diagnosing hardware and driver issues in Windows 11 entails locating faults with the hardware and software that enable your computer's components to communicate with the operating system.

**A step-by-step guide for diagnosing such problems is provided below:**

## Identify Symptoms

Pay attention to just any behavior that is rather unusual such as error messages, or performance issues your computer is experiencing. This includes blue screen errors (BSOOD), hardware not working as it should, system crashes, or peripherals not being recognized.

## Check Device Manager

Open the Device Manager. Right-click the Start button and choose Device Manager, look for any device with a yellow triangle icon; this shows that there is a driver issue. Right-click on the problematic device and select Update Driver to locate updated drivers online.

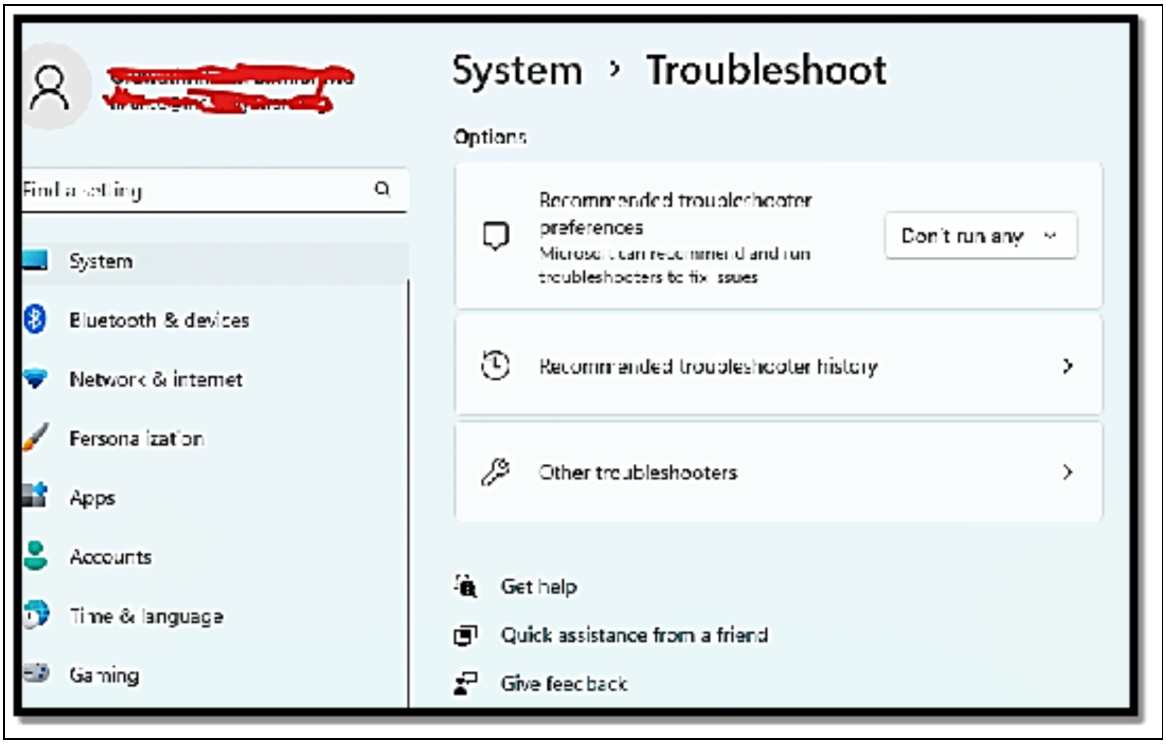
## Check for Windows Updates

Ensure your Windows 11 operating system is up to date. There are times when Windows updates may include bug fixes and updated drivers that can bring solutions to hardware-related issues.

## Run Windows Hardware Troubleshooter

**Windows has an in-built troubleshooter which is basically used for hardware issues.**

- Locate **Settings > System > Troubleshoot > Additional troubleshooters** then choose Hardware and Devices and execute the troubleshooter.




## Use Safe Mode

Boot your computer into Safe Mode in order to determine if the problem is related to third-party software or drivers. If the problem doesn't surface in Safe Mode, it is most likely caused by a third-party driver or software.

## Check for Overheating

System instability may be brought on by overheating. Check your CPU and GPU's temperatures with monitoring software. If there has

been an extensive buildup of dust, clean the internal parts and check the ventilation.

## Perform Hardware Diagnostics

Many computers have hardware diagnostic tools built in that are accessible during boot. These tests can assist in locating hardware problems like defective RAM or failing hard drives.

## Update BIOS/UEFI

If you are already having a compatibility issue with new hardware, having to update the BIOS or UEFI firmware of your motherboard may be all that you need.

## Activity

1. Analyze your system with the use of the Performance Analyzer.
2. Mention some command prompts.

# CHAPTER 19
# DEVELOPING ON WINDOWS 11

In the extensive developer survey conducted by StackOverflow, Windows is still the most widely used platform. However, the complete tale is a little more complex. Developers have been allowed to select the OS they use ever before open-source spread outside of academia and Windows desktop programs shrank to a small portion of the native app market. For some others, that's macOS, with its UNIX-like internals and high-end hardware. Others utilize Linux, which can be completely customized and is the same platform we use to deploy the majority of server applications. Whatever the case, one thing is certain: Microsoft will need to make a compelling argument to convince programmers to join on as it is about to deliver the first new version of its operating system in seven years. While developers are frequently discussed in relation to Microsoft's Windows

**Below are some highlights that show the changes that have been made in Windows 11 that make it the best for developers;**

- Windows Terminal is the modern command-line tool used by Microsoft. It is also installed by default in Windows 11.
- Webview2, although chromium-based, is an embeddable browser window. It will be needed to build desktop-skinned web applications with Blazor and will also be needed in showing web content in desktop applications. This is already being distributed in recent versions of Edge.
- Project Reunion can be described as Microfost’s attempt to break down the walls that exist between various types of Windows desktop applications which includes; WinUI, WPF, and Win32. In Windows 11, this app has been rebranded as Windows App SDK.

## Installing Development Tools

Developer tools are productivity add-ons that computer programmers use to simplify their work. Programming libraries like Node.js or Django are among these, as are tools like Git and Emmet. Anyone with goals for professional development will wish to learn some of these tools because each one of them performs a specific specialty purpose for making programming more approachable. In order to decide how to add these abilities to your professional toolkit, read this overview to discover more about developer tools, what they are, who uses them, and how to learn them. Developer tools are largely used to increase the effectiveness and efficiency of the coding and programming process for particular activities. As a result, the majority of what developer tools may be used for is geared toward enhancing what programming languages like HTML/CSS and JavaScript can be used for. For instance, Git isn't very useful by itself, but when combined with other programming languages, it becomes a potent tool for documentation and developer cooperation.

By automating the fundamental steps of the process, Visual Code Studio will enable developers to compile and debug code much more quickly than they otherwise might have been able to, enabling them to work on more complicated projects. On the other hand, having to learn how to make use of advanced programming frameworks and libraries will really expand the various things you will be able to do as a programmer. For instance, learning Node.js will enable you to be able to develop software applications that can read JavaScript code without the need to gain access to a web browser. This is a very important technical skill for building certain things like technologies that ensure that everything from digital assistants to smart cars is made possible. Also getting to learn the MERN stack will enable users to build full-stack frameworks for web applications with the use of just their knowledge of JavaScript.

Any ambitious computer programmer who wishes to increase the efficiency or scope of their work should learn developer tools. They will assist you in practically every stage of development. By way of illustration, Visual Code Studio's capabilities, including intelligent code completion, syntax highlighting, and direct assistance for debugging, will make it simpler for you to create routine elements.

Git supports students in collaboratively documenting and archiving their code, enabling them to maintain thorough records of their work and the changes made to their code. Emmet is a program created to be a quick plug-in for web development projects that makes creating HTML and CSS simple. Users can work more productively on development projects with the help of each tool, which has a distinct purpose. Programming frameworks and libraries are important additional developer tools that broaden the scope of what can be accomplished with a certain programming language.

To enable developers to create more intricate programs, certain libraries, like React, Node.js, and Django, can be taught in addition to their base language (typically JavaScript or Python). For instance, web developers will be able to create full-stack digital applications that can operate on virtually any device or platform by mastering the MERN stack, which consists of MongoDB, Express.js, React, and Node.js. This is true even though JavaScript is largely a web development language.

Although mastering any one of these tools is a wonderful method to increase a developer's job opportunities, understanding them all is a great way to work on projects that use JavaScript. Only a small number of developer tools that may be used to manage an existing Linux or Docker setup are supported on Windows. Windows is not supported by API Manager or API Gateway.

**On Windows, the following applications can be installed:**

Tools for Package and Deployment Creation, Policy Studio, and Configuration Studio. The developer tools can be installed using the same installer process as on Linux.

**Locate and launch the following setup file to launch the installer in the default GUI mode:**

- APIGateway_7.7_Client_Tools_Install_win-x86-32_BN.exe

The development tools that are needed can either be installed simultaneously or individually.

## Windows App Development

Windows 11 is based on the same Windows-as-a-service architecture as Windows 10. Much of the underlying Windows 11 code has already been utilized by insiders using the Dev branch of builds, albeit without the new Chrome. There shouldn't be many issues with the existing code and the new operating system since the 2xxxx series builds have shown to be compatible with the majority of Windows apps.

You may create the most effective desktop apps in the world thanks to the Windows App SDK and WinUI 3, which are the newest native app development for Windows 11. Support for the MSAL library, AppInstance APIs for handling and redirecting activation, AppWindow APIs for controlling your window regardless of what UI stack you're using, performance and reliability enhancements, and many more new features are all included in the Windows App SDK 1.0 Preview 1 release.

You may now launch your apps on Windows on ARM more easily thanks to Windows 11.  For the best performance on these devices, you can either compile your apps natively for ARM64 or run your unmodified x64 apps using emulation. The new ARM64 Emulation Compatible ABI, which is part of Windows 11 for ARM, enables you to create programs that can contain or load both ARM64EC and x64 code. This will eventually allow you to gradually transition current x64 apps to operate natively on ARM64.

## Activity

What is the relationship between Windows 11 and developing applications?

# CHAPTER 20
# VIRTUALIZATION AND HYPER-V

The last thing you want to do when you need to test a new app or internet service is put your work PC at risk. However, putting together a separate physical computer entails large hardware expenditure, not to mention the desk or workbench space a secondary system takes up and the upkeep it needs. Use of a virtual machine (also known as a VM), which enables you to create a simulated "computer within a computer" that you can use without investing in additional hardware or taking up more space in your physical environment, is a much better alternative to setting up a separate physical machine. The host computer's virtual machine is controlled by a system-level software layer known as a hypervisor and operates in a separate session on the host computer. The guest operating system is the one that is active inside the virtual machine. Just as if you were using a remote connection to connect to a PC, you launch the VM in a window that you may expand to fill your entire display.

A VM can run the same software as a real PC and communicate with other VMs and web-based services across a virtual network. Importantly, a VM just needs the hardware that is already present on the host PC. Windows 11's Pro, Enterprise, and Education business editions all come with a built-in hypervisor and related administration tools; Windows Server offers a larger selection of virtualization capabilities. Hyper-V is the name for all of these features put together.

## Setting up Virtual Machines

It is very helpful for developers, IT professionals, academics, and even authors of books on computer operating systems to set up one or more virtual computers with the aid of Hyper-V.

**Think about the benefits of a VM in the following situations:**

- There is a need for you to execute an app that has been written for an earlier version of Windows and does not work so well in Windows 11. Set up a virtual machine that executes the older version of Windows, install the outdated application in the VM, and then make use of the VM exclusively for working with that application.
- You are a web developer and there is a need for you to run a test on your website in various browsers and beneath diverse resource configurations. When you configure a virtual machine for each target configuration, you can then reliably reproduce what your audience will see and alter your code in accordance with it.
- You have gotten a suspicious email attachment and you are curious to know what it does. Professional researchers test software of unknown provenance or explore potentially dangerous websites with the use of a virtual machine that is well isolated from the host PC and also the host network. That enables them to check for possible malware without the need to jeopardize the host machine.
- You have a need to run a test on the insider version of Windows 11 or experiment with a non-Microsoft operating system like Linux. You can choose to configure a dual-boot configuration, but just making use of a virtual machine enables you to change between the alternative operating system and your host PC immediately, without the need for you to reboot.

When using a virtual machine, it is possible to take screenshots of displays that are otherwise impossible to do with standard screen-capture software, such as sign-in screens or even Windows setup screenshots before Windows is completely operational. For anyone creating documentation, the feature is priceless. Additionally, virtual machines are quite portable. By simply copying a few files, you can relocate a virtual machine to a different host.

Of course, there are some jobs that Hyper-V virtual machines are not ideal for. Any operation that needs direct access to actual hardware, such as using a discrete GPU to encode and decode video files, needs to be left to the real hardware. Similarly, any workload that

requires exact timing and minimal latency (including PC gaming) is likely to perform poorly in a VM. Your system has to fulfill certain minimum requirements in order to use Hyper-V, and you may also need to enable the Hyper-V function, which is covered in more detail later in this chapter. Once those preliminary steps are finished, you may construct and manage virtual machines using the Hyper-V Manager tool. You can run numerous virtual machines at once, each running independently of the others if your system has the resources. Each VM can run a different version of Windows, whether it is 32-bit or 64-bit, old or new, server or desktop, or even another operating system that runs on PC-compatible hardware because they operate as separate computers.

## Creating an instant VM with Windows Sandbox

You don't have to spend time building a virtual machine with Hyper-V and then removing or resetting it when your experiment is finished when you only want to check out a dubious web link or test an app or online service. Use the Windows Sandbox feature as an option to create a temporary virtual system that is highly lightweight, clean, and available in a matter of seconds without the need for any further downloads. Every trace of the sandbox is erased when you close it, and every subsequent session begins with a fresh baseline. Although it functions separately, Windows Sandbox shares the same underlying technology as the Hyper-V architecture. You need to be running Windows 11 Pro, Enterprise, or Education and have hardware virtualization enabled in your PC's firmware in order to use the feature. Open the Windows Features dialog in the Control Panel, check the Windows Sandbox checkbox, and then click OK if you meet both of those requirements. (To utilize Windows Sandbox, you do not need to enable any of the Hyper-V capabilities.)

**There are certain things that are worth noting about these lightweight virtual machines;**

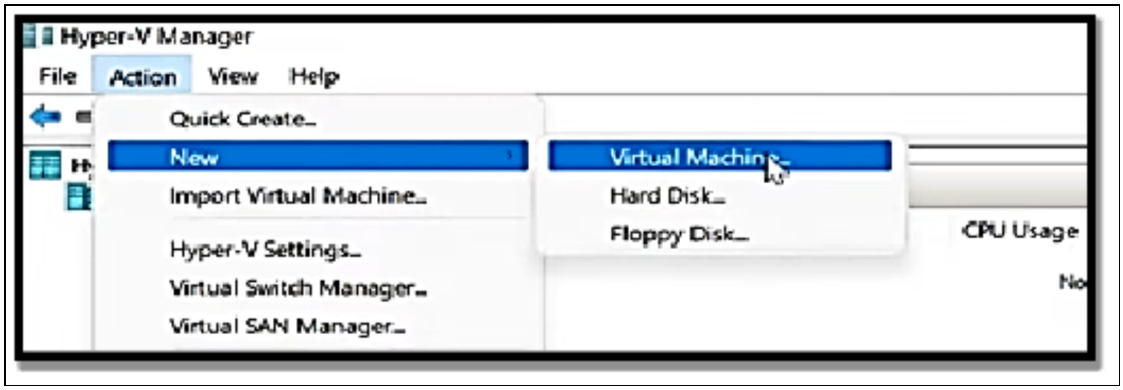
- The sandbox executes an unactivated copy of Windows 11; the edition and version that is matched to those of the host of the PC.

- Windows Defender Antivirus protection is switched off. Since the sandbox is not persistent or linked to the host, this simply means malicious code can be executed but it cannot cause damage outside the sandbox.
- A small number of Windows accessories, administrative tools, as well as system utilities are available, which also include Notepad, Windows Powershell, and Windows Media Player Legacy. With the noteworthy exception of File Explorer and the Microsoft Edge browser, nevertheless, no Windows 11 apps are installed or available.
- Lots of administrative functions are disabled, which includes the ability to install updates and inspect disks and network configuration.
- The default user account is a local administrator known as WDAGUtilityAccount; that account can also be used by the Windows Defender Application Guard feature for browsing web pages in an isolated environment.

## Building a custom VM with the New Virtual Machine Wizard

The Quick Create option is unsuitable for you if you prefer to have complete control over the process of building a new VM. Open Hyper-V Manager instead, then

- Select **New > Virtual Machine from the Actions pane**. The New Virtual Machine Wizard is started by that action.



The wizard guides you through creating a virtual machine as you navigate through it. To move through each setting group, click the Next and Previous buttons, or use the links on the left side. To construct a virtual machine that utilizes default values for whatever wizard pages you skip, click Finish at any time during the wizard. You can permanently delete the text-only Before You Begin page from the wizard by choosing the option to Never Show This Page Again. The options you have at each subsequent wizard stage are described in the remaining paragraphs of this section.

Open the New Virtual Machine Wizard and click Finish right away for quick results. However, as it turns out, both the associated Quick Create option and the upfront efficiency are merely illusions. The generic default names for the virtual machine (VM) and virtual hard disk, as well as the amount of memory that is available, must all be changed manually if you use the wizard in this way. You will also need to attach installation media. Furthermore, the default setup creates a Generation 1 VM that cannot be switched to a Generation 2 configuration. The wizard requests a name for your virtual machine once you complete the Before You Begin page. With a name that distinguishes this virtual machine from others you might create, replace the default New Virtual Machine item. The proposed name for the virtual hard disk you create will be taken from this entry again by the wizard later. Select the checkbox and provide a different location if you don't like the suggested storage location for the virtual machine files.

After you build the VM, you can modify the place where the virtual machine configuration files are kept, but it's not simple. The location of the paging file can be altered by modifying the VM settings, and the virtual hard disk can be relocated by right-clicking the machine name and selecting the Move option, however, these options aren't accessible for the core configuration files. You can export, copy, and store a virtual machine in a separate location in order to subsequently entirely shift all of its components. It is much better to select a good site first, before building the virtual computer. Choose Generation 1 or Generation 2 on the Specify Generation page depending on the kind of virtual machine you require. Select

Generation 2 to make additional capabilities like Secure Boot available if you plan to install a recent, supported version of Windows in your virtual machine. The Generation 1 default setting is perhaps a better alternative for an older operating system.

The amount of RAM to assign to the VM at startup is specified on the Assign Memory page. Unless you choose the Use Dynamic Memory for This Virtual Machine option, this amount stays assigned to the VM while it is running. Keep in mind that you cannot enter values for Minimum RAM and Maximum RAM using the wizard. Instead, Hyper-V assigns 512 MB and 1.0 TB, respectively, if you utilize the New Virtual Machine Wizard and activate dynamic memory. By changing a VM's settings after you create it, as is covered in greater detail later in this chapter, you may exert much more precise control over memory.

A dynamically expanding virtual hard disk using the VHDX format and a default name based on the name you gave in the first step are created by default by the New Virtual Machine Wizard. (You may alternatively choose to give the location of a VHDX file that is already present.) Select the Attach A Virtual Hard Drive Later option and modify your VM after the procedure is finished if you wish to build a fixed-size virtual hard drive or utilize the older VHD format. A virtual machine can have numerous hard drives, just like a physical computer can; the wizard simply lets you build or attach the system drive. This drive is automatically generated in the Public user profile's Shared Documents folder, where it may be accessed by any user that logs in to the host PC. Any physical disk that is available to the Hyper-V host can be used instead of the default location for the virtual hard disk.

## Running a virtual machine

A virtual machine is opened in a Virtual Machine Connection (VMConnect) window by double-clicking its name in Hyper-V Manager. You will be directed to the computer in its current condition if the VM is already operating. You must click Start to turn on a newly generated VM that you are running for the first time or a previously

built VM that is off or dormant. (You can click Action > Start from the Virtual Machine Connection menu bar, or use the button in the connection window or on the toolbar.)

**There are two session types available when running a session in a Virtual Machine Connection window:**

- The VMConnect console window, which may be enlarged to any resolution supported by the virtual display adapter, is where basic sessions are executed. The contents of the VM display are displayed in this sort of session, which also allows keyboard and mouse input. However, external USB devices or audio hardware are not accessible. For VMs running Windows Home edition (regardless of version), this is the only choice.
- With the ability to share the Clipboard with the host computer, reroute audio from the virtual machine to the host computer's speakers or headphones, share local drives and some USB devices, connect to a printer via the host computer, and sign in using a smart card, enhanced sessions offer a noticeably richer experience. Additionally, enhanced sessions are compatible with multi-touch screens, multiple monitor setups, and greater display resolutions.

A supported guest operating system is needed for enhanced session mode, which uses Remote Desktop Protocol via the virtual machine bus (VMBus) and calls for Windows 8.1 or later (Pro, Enterprise, or Education edition) or Windows Server 2012 R2 or later. The guest operating system does not need to have remote desktop connections enabled. The sole option to a basic session for guest operating systems that don't allow enhanced sessions, like Windows 7 Pro, is to set up a network connection in the virtual machine and use the Remote Desktop client to connect to it. A shared Clipboard and audio support is only a couple of the capabilities offered by that option, which is not supported by the Home edition.

## Using Hyper-V Testing and Development

Long a powerful feature in Microsoft Windows server editions, Hyper-V (or, more precisely, the Hyper-V role) allows IT managers to

host many server roles, each in its own virtual machine, on a single physical computer. To the great joy of IT professionals, developers, security researchers, and tech fans, Microsoft has included so-called Client Hyper-V with the Pro, Enterprise, and Education editions of Windows since the release of Windows 8 in 2012. While there is some overlap, there is not a perfect match between Client Hyper-V and Windows server editions' equivalent feature sets. Client Hyper-V in Windows 11 has the capacity to produce virtual machines that support virtualized Trusted Platform Modules and Secure Boot. These virtual machines also have support for layered virtualization, which enables virtual environments to host other virtual machines.

The Hyper-V platform consists of the Hyper-V hypervisor and a collection of services for managing virtual hardware, establishing connections to virtual networks, and operating virtual machines. The Hyper-V Host Computer Service (Vmmcompute.exe) and the Virtual Machine Management Service (Vmms.exe) in particular run using the credentials of the user who is currently logged in. Other components of the Hyper-V infrastructure run using local systems and service accounts, allowing VMs to run even when no user is logged in.

- **Hyper-V Manager (Virtmgmt. msc):** A Microsoft Management Console snap-in that offers management access to the virtualization platform. Making use of Hyper-V manager, you can design a new virtual machine; modify the configuration of an existing VM; set virtual networking and storage hardware; bring in, export, and share VMs; and then modify the configurations of the Hyper-V platform itself.
- **Virtual Machine Connection:** a Windows desktop application that lets you use the host PC's keyboard and mouse to communicate with a virtual machine that is currently operating. The application can operate in full-screen mode, where the virtual machine's display replaces the host PC's display, or in a window, where its contents serve as a virtual monitor for the VM.

Running Hyper-V on older Windows systems needed careful inspection (and perhaps additional configuration procedures) to confirm that the host computer's CPU supported the essential virtualization features. These capabilities are enabled by default on a computer that satisfies Windows 11's hardware requirements, therefore thorough hardware compatibility checks are not required. However, Windows 11 Pro, Enterprise, or Education must be installed on the host PC because Windows 11 Home does not support Hyper-V features. Beyond these fundamental criteria for compatibility, the most crucial factor to take into account is **making sure the host PC has enough system resources (memory and disk space) to perform the expected workloads:**

- Even though a host computer with 4 GB of total RAM can construct and run a low-resource virtual machine, we advise at least 8 GB (and preferably 16 GB) of total RAM for satisfactory performance with one or more virtual machines running Windows 10 or Windows 11.
- On your hard disk, there are files for each virtual machine. Expect to utilize at least 20 GB of disk storage for each virtual machine, while the size might vary significantly depending on how you configure your virtual machines (for instance, whether you use fixed or dynamically growing virtual hard drives), how many checkpoints you keep, and other factors.

The entries listed under the Hyper-V Platform category will be darkened and unavailable if your machine does not fully support Hyper-V. Your computer's operating system, which is likely Home Edition and doesn't support the entire Hyper-V platform, is the most frequent cause of this issue. Upgrading to a supported Windows edition is the sole solution in that situation. If your hardware doesn't have the necessary virtualization features enabled, you can also run into this issue. A PC's firmware settings are often where the switches to configure hardware-based virtualization features can be found. When using Windows, select Start, click Power, and then click Restart while holding down Shift to view the firmware settings.

Any PC running any version of Windows 10 or Windows 11 can have the Hyper-V Management Tools functionality installed. As a result, even if the Hyper-V Platform entries are darkened (indicating that your computer isn't equipped to host virtual machines), you can still use the Hyper-V Management Tools to manage virtual machines that are hosted on another physical computer, usually one that is running Windows Server.

## Activity

1. Configure your Virtual Machines.

# CHAPTER 21
# ADVANCED NETWORKING AND SECURITY

Utilizing more sophisticated features, settings, and tools to improve security, manage network-related tasks, and optimize network performance are all part of Windows 11's advanced networking and security capabilities. The following are some areas where Windows 11 will concentrate on improved networking and security: Windows 11 comes with built-in network diagnostics tools that can be used to find and fix connectivity problems. The Settings app provides access to these functions. In order to fine-tune network sharing permissions for files, folders, and printers, use advanced sharing options. These options can be controlled in the shared resource's Properties. Furthermore, you can encrypt your entire drive with BitLocker to safeguard your data from illegal access. For laptops and other portable devices, this capability can be very crucial. Customize Windows Firewall rules to regulate incoming and outgoing traffic with more precision. Secure Boot makes sure that only operating system components that have been digitally signed and verified are loaded during the boot process, thwarting assaults at the boot level.

Always keep in mind that it's critical to have a thorough understanding of the adjustments you're making and their potential effects while working with complex networking and security settings. Misconfigured systems may experience connectivity problems, instability, or security flaws. It's advised to seek advice from IT experts or the official Windows documentation if you're unsure about your skills.

## Firewall Configuration and Rules

The Windows Defender anti-malware package has received a lot of improvement ever since its first introduction, and the version included with Windows 11 is extremely good at catching and eliminating malware. Most people can bypass with just the Windows

Defender antivirus component without the need to install another secondary antivirus or anti-malware package. Certain premium antivirus programs are quite more rated than Defender in terms of getting and eliminating new and unknown malware, but the firewall component of Windows Defender is very good for almost all situations.

If you don't have any other firewalls operating, you should leave the default firewall enabled as Windows Defender is activated by default. You should activate the Windows 11 firewall if you've previously disabled it for some reason and haven't done so with another program. Your computer is susceptible to external attacks if you don't have a firewall.

**Follow the steps below to switch on the Windows 11 firewall;**

- Right-click the **Windows icon on the taskbar**.
- Choose **Settings**.
- Choose **Privacy & Security**.

- Choose **Windows Security**.
- Choose **Firewall & network protection**.
- If the firewall happens to be off, you will see a red icon in the Firewall & network protection aspect, and a button also.

Choose the Turn on button to turn on the firewall.

- The firewall will turn on, the red x will switch into a green check, and the button will leave. You can choose the Firewall & network protection icon to check the settings of your firewall.
- Choose a **Public network to check your firewall settings**.
- If the firewall is switched on, the Microsoft Defender Firewall switch will be on.
- If you choose the toggle, Microsoft Defender will be switched off, and you will see a red **x with a warning message**.
- If you see the Firewall & network protection screen with your public firewall off, a warning message will be shown.

## Network List Manager Policies and Group Security

The many features of how networks are listed and displayed on a single device or across a large number of devices can be configured using Network List Manager Policies, which are security settings. Using the Microsoft Management Console (MMC) and the Group Policy Object Editor snap-in, you may update the local computer policy to set up Network List Manager Policies for a single device. The Network List Manager Policies can be found in the path below in Group Policy Object Editor; **Computer Configuration > Windows Settings > Security Settings > Network List Manager Policies**. Follow the Group Policy instructions to discover how to update the policies for the object that you need in order to configure Network List Manager Policies for a large number of computers, such as all of the Domain Computers in an Active Directory domain. The above-mentioned approach leads to the Network List Manager Policies.

## Policy settings for Network List Manager Policies

The following policy settings are provided for Network List Manager Policies. These policy configurations are located in the details pane of the Group Policy Object Editor, in Network Name.

## Unidentified Networks

If Windows is unable to identify a network owing to a problem with the network or a lack of distinguishable characters in the network information the operating system receives from the network, you can configure the Network Location, including the location type and user permissions, using this policy option. The network location of a computer recognizes the kind of network it is attached to and instantly configures the proper firewall settings for that location. **For this policy setting, you can configure the following elements:**

- **Location type. For this item, the following options are available;**
  - Not configured. If you choose this option, this policy configuration does not apply a location type to unidentified network connections.
  - Private. If you choose this option, this policy configuration applies a location type of Private to unidentified network connections. A private network, like a home or work network is a location type that assumes that you trust other computers on the network. Do not choose this item if there is a possibility that an active, unidentified network is in a public place.
  - Public. If you choose this option, this policy configuration applies a location type of Public to unidentified network connections. A public network, like the wireless network at an airport or coffee shop, is a location type that assumes that you do not trust the other computers on the network.
- **User permission. For this item, the following options are available;**
  - Not configured. If you choose this option, this policy configuration does not specify if users can alter the location for unidentified network connections.
  - Users can change location. If you choose this option, this policy setting enables users to alter an unidentified network connection location from Private to Public or from Public to Private.
  - Users cannot change location. If you choose this option, this policy configuration will not allow users to alter the

location of an unidentified network connection.

## Identifying Networks

While Windows attempts to determine the network and location type, this policy option enables you to set the Network Location for temporary networks. The network location of a computer recognizes the kind of network it is attached to and instantly configures the proper firewall settings for that location.

**For this policy setting, you can configure the following elements:**

- **Location type. For this item, the following options are available;**
  - Not configured. If you choose this option, this policy configuration will not apply a location type to network connections that are in the process of being identified by Windows.
  - Private. If you choose this option, this policy setting applies a location type of Private to network connections that are in the process of being identified. A private network, like a home or work network, is a location type that assumes that you trust the other devices on the network. Do not choose this item if there is a possibility that an active, unidentified network is in a public place.
  - Public. If you choose this option, this policy setting applies a location type of Public to network connections that are in the process of being identified by Windows. A public network, like a wireless network at an airport or coffee shop, is a location type that assumes that you do not trust the other devices on the network.

## All Networks

You can provide user permissions in this policy option to determine whether users are allowed to modify the network name, location, or icon for any networks to which they connect.

**For this policy setting, you can configure the following elements:**

- **Network name. For this item, the following options are available;**
  - Not configured. If you choose this option, this policy setting does not indicate if users can alter the network name for all network connections.
  - Users can change names. If you choose this option, users can alter the name of the network for all networks to which they connect.
  - Users cannot change names. If you choose this option, users will be unable to change the name of the network to which they connect.
- **Network location. For this item, the following options are available;**
  - Not configured. If you choose this option, this policy setting will not indicate if users can alter the location for all network connections.
  - Users can change location. If you choose this option, this policy configuration enables users to alter all network locations from Private to Public or from Public to Private.
  - Users cannot change location. If you choose this option, this policy setting will not allow users to alter the location for any networks to which they connect.

# Implementing Encryption and Secure Boot

Data on your device is protected by encryption so that only authorized users may access it. If your device doesn't support device encryption, you might be able to activate conventional BitLocker encryption in its place.

**Turning device encryption on;**

- Sign in to Windows with an administrator account. Note that there might be a need for you to sign out and sign in again in order to get accounts switched.

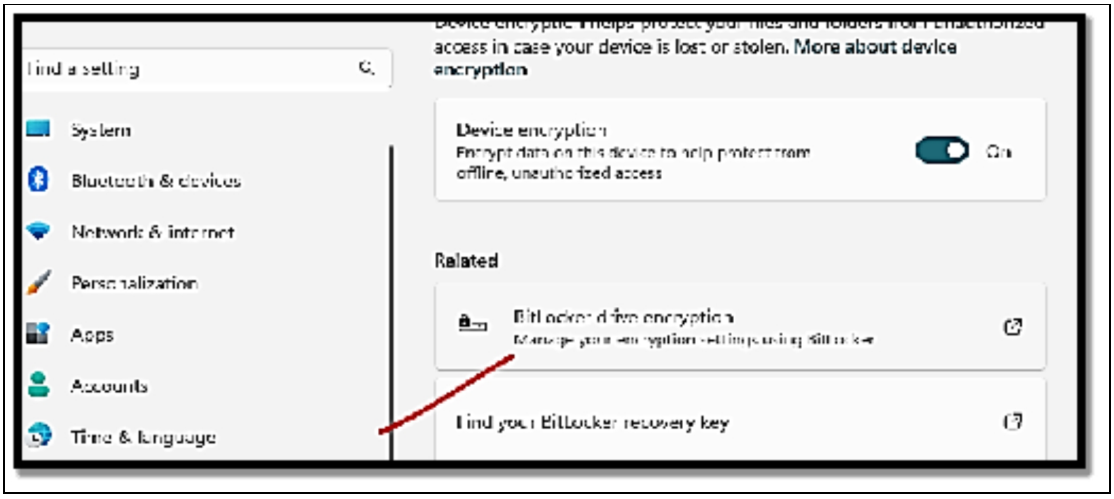
- Choose **Start > Settings > Privacy & security > Device encryption**. If Device encryption is not displayed, it then is not available. You are then able to make use of standard BitLocker encryption as an alternative.

- If Device encryption is switched off, turn it On.

## Turn on standard BitLocker encryption

- Sign in to your Windows device with the use of an administrator account.
- In the search box on the taskbar, type Manage BitLocker and then choose it from the list of results. As an alternative, you can also choose **Start > Settings > Privacy & security > Device encryption**

## Bitlocker drive encryption.




**It is worth noting that you will only see this option if Bitlocker is available for your device.**

- Choose **Turn on BitLocker** and then follow the necessary instructions.

## Secure Boot

The necessity for Secure Boot and the Trusted Platform Module (TPM) version 2.0 on Windows 11 is one of the biggest changes. TPM 2.0 and Secure Boot are required, according to Microsoft, to improve security and stop (or at least lessen) sophisticated assaults, widespread malware, ransomware, and other threats. When encrypting the hard drive using features like BitLocker, TPM is a piece of hardware that is typically (but not always) incorporated into

the motherboard and provides a safe environment to store and protect the encryption keys. Secure Boot, on the other hand, is a module that makes sure the device only boots using software that the maker trusts. **To check if your Windows has TPM 2.0, follow the settings below;**

- Open the **Start menu**.
- Search from tpm. msc and then choose the top result to open the “Trusted Platform Module (TPM) Management’ tool.
- In the “Status" and “TPM Manufacture Information” sections, confirm TPM is there and also make a confirmation of the version.

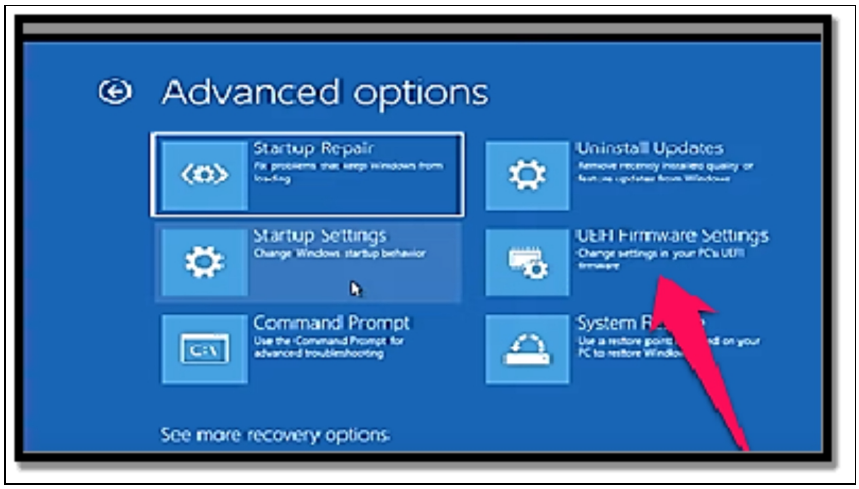
If you have found out that the computer has a TPM chip, you will see the hardware information and its status. As against that, if it reads “Compatible TPM cannot be found”, the chip is disabled on the UEFI, or the device does not possess a compatible Trusted Platform Module.

## Enable TPM 2.0 in BIOS for Windows 11

**If you would like to enable TPM 2.0 in the BIOS to fix the Windows 11 installation, make use of the following steps;**

- Open **Settings**.
- Choose **Update & Security.**
- Choose **Recovery.**
- Beneath the Advanced Startup section, choose the **Restart Now button**.
- Choose **Troubleshooting.**
- Choose **advanced options**.

- Choose the UEFI Firmware settings option.




- Choose the **Restart button**.
- Select the advanced, security, or boot settings page, based on the motherboard.
- Choose the **TPM 2.0 option, and select the Enabled option.**

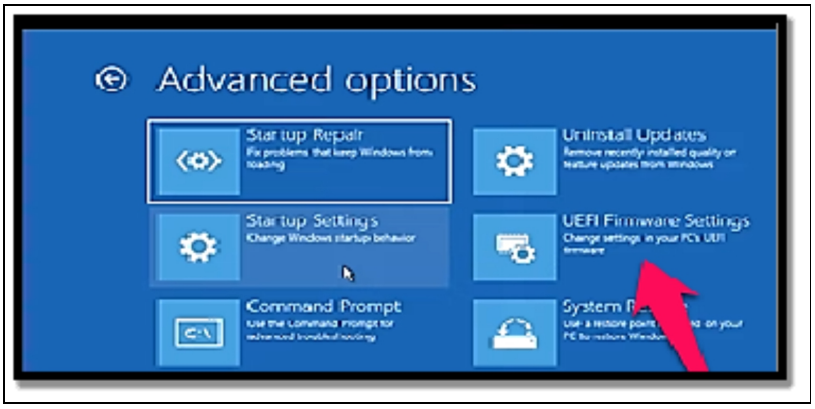
The module may be incorporated into the CPU if your motherboard doesn't have a TPM chip and you're using an AMD processor; in that case, the choice will say "fTPM" (firmware-based TPM 2.0) or "AMD fTPM switch." TPM 2.0 will be accessible as Platform Trust Technology (PTT) if the system is Intel-based. If this is a custom-built computer without a TPM option, you might be able to buy a module to add the functionality. To verify that assistance is available, you should visit the website of the motherboard maker. Check if Secure Boot is present for Windows 11

**To check if Secure Boot is enabled on the computer, make use of these steps;**

- Launch the **Start window.**
- Look for System Information and choose the top result in order to open the application.
- Choose **System Summary on the left pane.**
- Check the Secure Boot State information and then confirm the feature is switched On. If it is not, then there is a need for you to enable the option manually.

Upon the completion of the steps above, you can then proceed with the Windows 11 installation if the security feature is enabled. Otherwise, there will be a need for you to **follow the steps to enable it on the inside of the UEFI firmware. Enable Secure Boot in BIOS for Windows 11**

- Open **Settings**.
- Choose **Update & Security.**
- Choose **Recovery**.
- Beneath the Advanced Startup section, choose the Restart Now button.
- Choose **Troubleshooting**.
- Choose **advanced options**.
- Choose the **UEFI Firmware settings option**.




- Choose the **Restart button.**
- Choose the **advanced, security, or boot settings page, based on the motherboard.**

- Choose the **Secure Boot option, and then choose the Enabled option.**

Secure Boot is almost always included in devices with UEFI firmware, but if it isn't, you'll need to upgrade the operating system or think about buying a new computer that complies with Windows 11 standards. The computer must pass the hardware verification procedure once you've finished the steps in order to proceed with an in-place update or a fresh installation of Windows 11.

# Activity

1. Configure Firewall on your system.
2. Explain what encryption and secure boot means.

# CHAPTER 22
# CLOUD INTEGRATION AND ONE DRIVE

Cloud integration can be described as the process of connecting diverse software applications, systems, and platforms to cloud-based services or resources. This integration enables seamless data sharing, communication, and collaboration between various applications and services hosted in the cloud. To be more specific, OneDrive can be described as a type of cloud storage service, designed by Microsoft as part of its suite of Office 365 which is now regarded as Microsoft 365 applications. It enables users to save, access, and distribute files and documents from just about anywhere but with the help of an internet connection. With the use of OneDrive, users can save files in the cloud and gain access to diverse devices. Cloud integration can deal with the synchronization of files and folders between the local drive of a user and their OneDrive storage. This enables users to have rather consistent access to all of their files across various devices. This means that traveling and forgetting your device isn't a problem anymore, you can still gain access to any of your files as long as you have your details i.e. email and password.

By enabling many people to access and work on the same documents at once, OneDrive makes collaboration easier. OneDrive could be used as a central store for documents that require collaboration as part of cloud integration, allowing for real-time editing, commenting, and change tracking. OneDrive cloud integration may offer automated backup options. A local device's files can be automatically backed up to OneDrive, providing data security in the event of device loss or failure. Some software programs have direct integrations with OneDrive, enabling users to access, save, and share files from within those programs. For

instance, OneDrive and Microsoft Office programs are frequently seamlessly integrated. If you are not quite used to cloud integration, you might be scared about a possible breach in security thereby other people gaining access to some classified document you might have saved on the cloud. It is however worth noting that cloud integration with OneDrive involves the management of permissions and security configurations for shared files and folders. This ensures that only authorized users will be able to access certain content. One Drive also provides version history which enables users to monitor and check the changes that must have been made to documents over time. Cloud integration can help make better version control by ensuring it becomes much easier to bring back previous versions of the documents. Collaboration, accessibility, and data redundancy can all be improved with cloud integration with OneDrive. When incorporating cloud services into your workflows, it's crucial to take data security, privacy, and compliance regulations into account.

## OneDrive and OneDrive for Business Work

Although the two Microsoft cloud-based file-storage services have similar names and sync clients, they operate somewhat differently. The consumer service, OneDrive, has unique displays that highlight photo libraries and albums and are geared for personal usage. The option to sync the device's camera roll to OneDrive is available in the OneDrive client for mobile devices. Anyone may create and edit documents using the online versions of Word, Excel, PowerPoint, and OneNote with a free OneDrive account. Users of the Windows versions of those Office products can generate and modify files using the Microsoft 365 Family and Personal editions since they automatically establish connections to OneDrive accounts.

Files saved in OneDrive are well arranged in folders and subfolders just like they would in any other local drive. It is worth noting that you take note of the range of options that can be found in the command bar for the chosen folder and also the additional menu choices available from the More menu option. OneDrive for Business provides a quite similar web-based view with just one very important difference; Subscription configurations cannot be accessed from the

navigation pane on the left. This is simply because a OneDrive for Business subscription is controlled by a company administrator, with more security and collaboration options as needed by an organization. The two services enable subscribers to share files and folders with other people.

The consumer edition of One Drive enables total control of sharing; you can decide to make a picture, file, or the whole folder public. You can also choose to share access by making use of a link that has no need for you to sign in with the use of a Microsoft account. An organization administrator controls the sharing choices for OneDrive for Business and may impose limitations on file sharing, particularly in folders containing sensitive corporate data. Versioning is a feature that is incorporated into OneDrive and OneDrive for Business, allowing you to see a document's history and download a previous iteration if you need to restore a section from an earlier draft. Both services allow you to retrieve deleted documents for up to 30 days using the Recycle Bin.

## Setting UpOneDrive for Cloud Storage

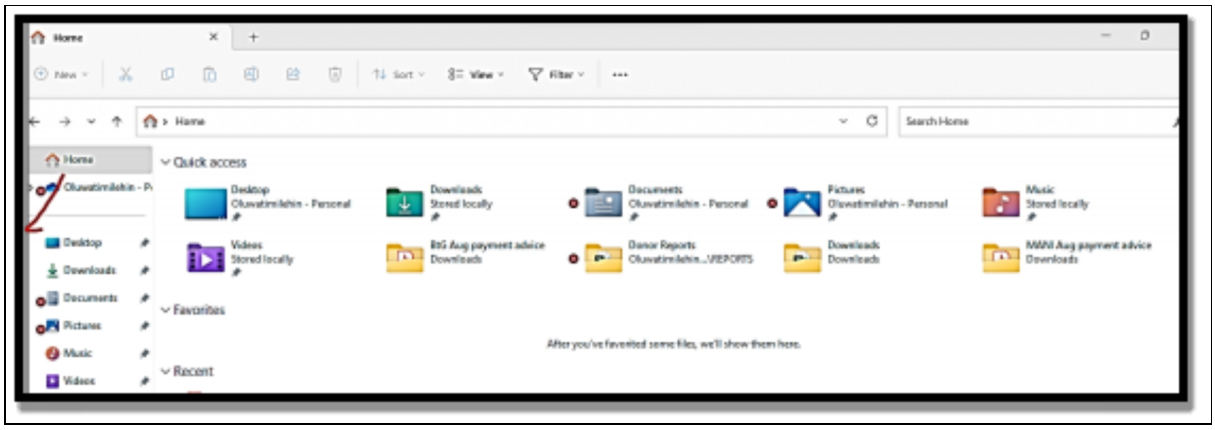
OneDrive can be used on the web and on mobile devices, but it works best when synchronized with a Windows-based computer, especially when used with the Office desktop applications from Microsoft 365. A Windows 11 user profile can only have one personal OneDrive account linked to it. Each user profile can be connected to one or more OneDrive for Business accounts. When creating a new user profile on a PC running Windows 10, you are prompted to link your Windows account to OneDrive. The sign-in question can be ignored if you don't want to sync your files with OneDrive. You can deal with it later, or never. But with Windows 11, this setup option has undergone a big modification.  Whenever you make use of a Microsoft account to sign in for the first time on a new installation of Windows 11, the first setup for the user profile will help establish a connection between your device and OneDrive using the same account. If you sign in with the use of a local account or with the use of an Azure AD account, your computer will not be linked

instantly to OneDrive, there is a need for you to make this connection manually.

When you sign in with the use of a Microsoft account and then make a choice of default options, Windows will also allow a feature known as OneDrive Backup to have access. This feature is quite of great use but can be a little confusing. Below is how it works. Desktop, Documents, and Pictures are the three folders that OneDrive Backup is accessible for in your user profile. When you enable OneDrive Backup, Windows looks to see if you already have folders with those names in your OneDrive account; if not, it creates those folders for you. The files are then transferred by Windows from your local folders to their OneDrive counterparts. Last but not least, Windows modifies the default location for shortcuts in your user profiles so that when you select Documents, the synchronized location for the OneDriveDocuments folder rather than the local folder, C: UsersusernameDocuments, opens. Even though you have the option when you first configure a profile to save files locally as against switching OneDrive Backup on, most people will like to choose the Next and then enable instant integration. This can bring about a surprise you are really not pleased with especially if you are not prepared for it.

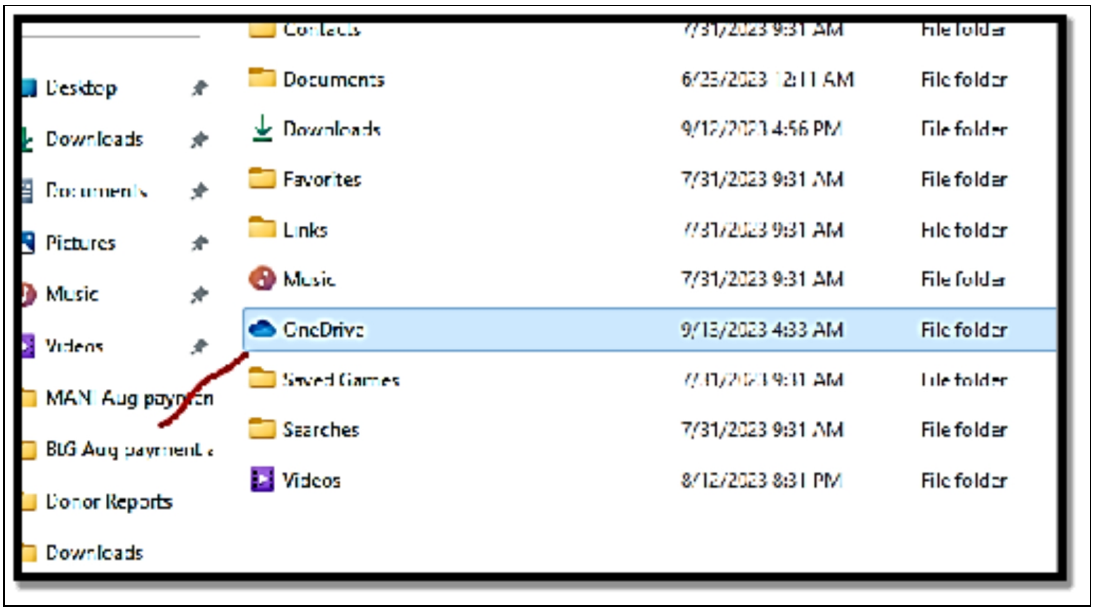
The OneDrive Backup function is undoubtedly a good addition if the freshly configured PC is the only PC linked to this Microsoft account. However, if a different PC is also backing up those folders to OneDrive, you may see all of its data in the corresponding folders on your new PC. Additionally, any files you add, modify, or remove on either device are synced to both locations. That may result in space issues, especially if your OneDrive storage is limited. Third-party programs that keep configuration and data files in the Documents folder may also have issues as a result. If you would like to check if OneDrive Backup is configured,

- Open **File Explorer** and then select **Home**.



- If you see the OneDrive label under the Desktop, Documents, and Pictures folders, you can then choose to turn the automatic backup off before you proceed to do anything.

- If you would like to switch OneDrive Backup off, right-click the **OneDrive node** in File Explorer's navigation pane and then choose **OneDrive**

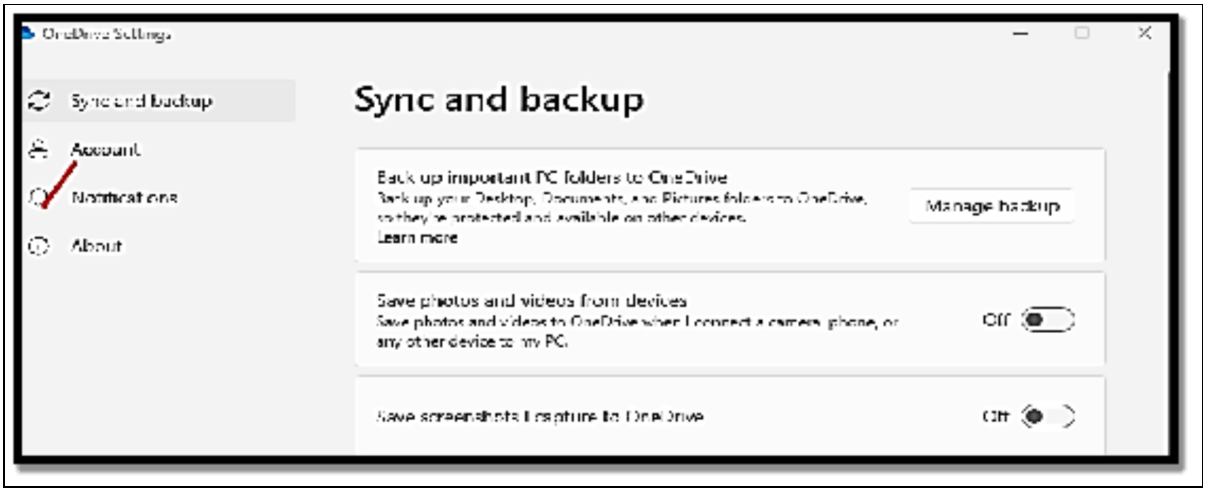



**> Settings**. In OneDrive's Settings, choose **the Sync and Backup tab**, and then choose **Manage Backup**. Once done, this will open the **Manage Folder Backup dialog**.

- Choose **Stop Backup** for one or some folders to bring an end to syncing the local folder to OneDrive.

Once you have stopped backup, Windows will alter the File Explorer shortcuts for all of the folder back-ups to the locations in your local user profile but does not in any way move files from OneDrive to the local folder. Windows will add a Where are my files? Link to the respective folder. Do not fret if you happen not to be able to see your files, they are still in the matching folder in OneDrive and you can choose to either copy or move them to the local folder or go back to the Manage Folder Backup dialog and choose Start Backup in order to have order restored. It should be noted that, despite being the most typical (and logical) setup, the Microsoft account you attach in OneDrive does not have to be the same one you use to sign in to Windows. You must first unlink the default account by opening OneDrive Settings and selecting the Unlink This PC option under the Account page if you decide for whatever reason to use a different OneDrive personal account than the one you sign in with.

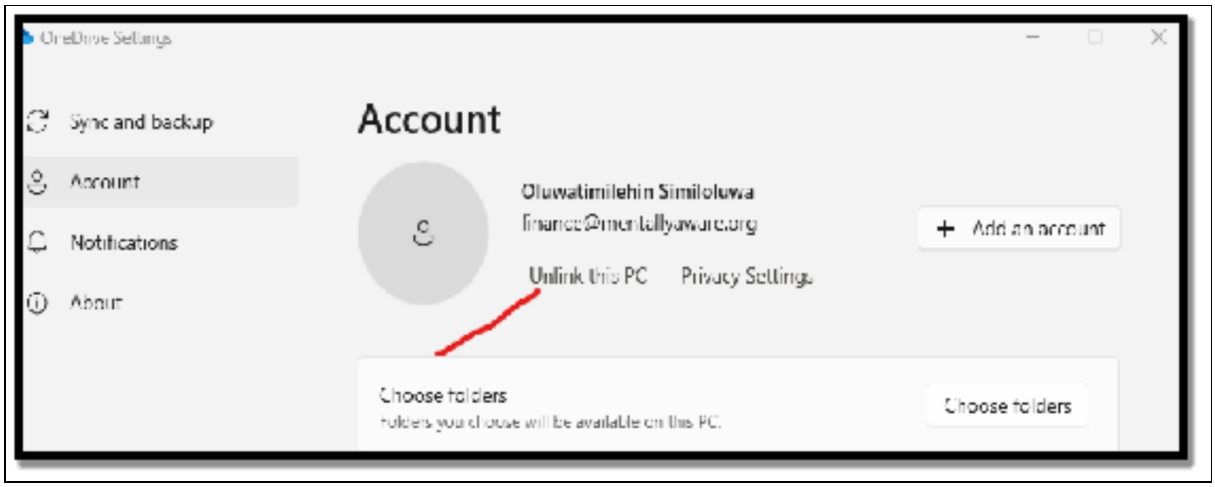
- Open OneDrive Settings, select the **Account tab,**




- **And then click Add An Account** to add a OneDrive for Business account. Follow the OneDrive setup wizard after entering your credentials to establish a local folder to store your synced files. If you want to create more OneDrive for Business accounts, repeat this procedure.

There are always various preferences for different things, If you happen to be opposed to saving files in the cloud or maybe you prefer to make use of another cloud service or you just happen not to see a need for OneDrive, you are free to disconnect OneDrive. If you have not yet signed in to OneDrive, choose Cancel when you see the prompt to sign in to the sync client; with this, all of your files will remain on your local drive or on your network. If OneDrive happens to be connected to your Windows account,

- Open **OneDrive Settings**, and on the **Account tab**, choose **Unlink This PC**.



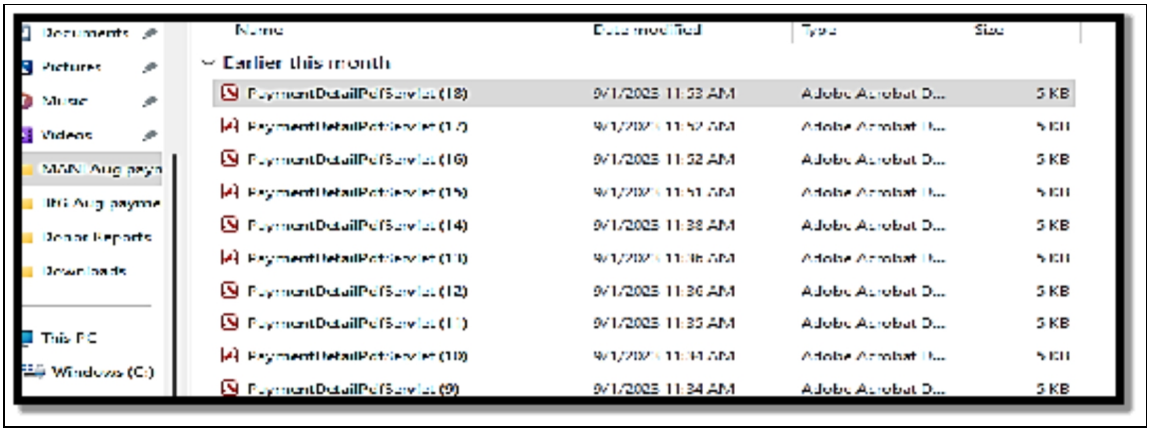

## Collaborative Editing with OneDrive

OneDrive's excellent collaborative editing function makes it possible for numerous people to collaborate on the same document at once, making it a useful tool for remote and workgroup collaboration. You must store the document you wish to collaborate on in OneDrive or a shared folder within OneDrive before you can begin collaborative editing. You can upload an existing file to OneDrive or create a new one using Microsoft Word, Excel, PowerPoint, or any other supported file format. When collaborators open the shared document, they can begin editing it in real-time using the desktop apps (Word, Excel, PowerPoint, etc.) or the online versions of Microsoft Office apps (if they have them installed). The cloud is automatically updated with each user's changes, and yours. Participants can post comments on certain sections of the paper, making it simple to offer suggestions or pose queries. Real-time communication within the document is made possible by the integrated chat functionality included in several Office apps. Documents can be edited offline by collaborators, and once they have an internet connection, their modifications will be synced to the cloud. This gives you freedom in terms of where and how you work on collaborative papers. Overall, OneDrive's collaborative editing feature streamlines teamwork by giving users a platform for smooth, concurrent document editing, feedback, and communication. It's a great tool for in-person and remote collaboration, facilitating

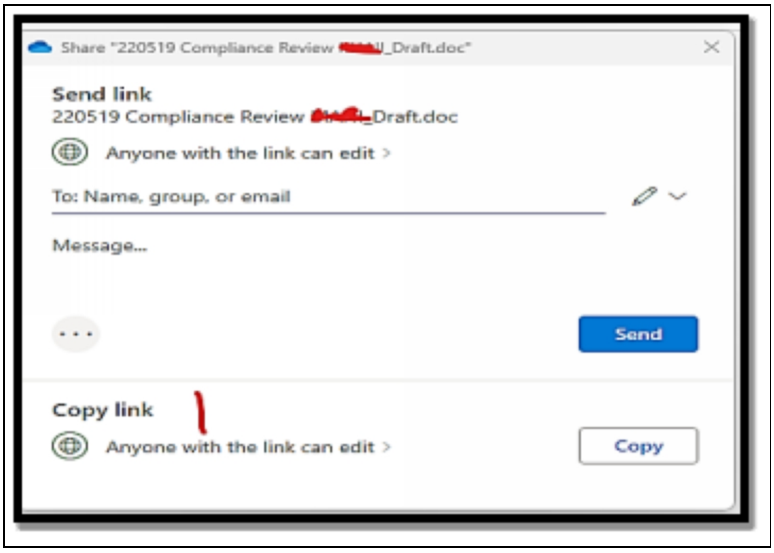
productive teamwork on projects, reports, presentations, and other things.

**Follow the steps below to share and collaborate documents;**

- Right-click on **the files or folders** you would like to share or have people collaborate with you.




- Choose **Share.**
- Choose **Anyone with this link** can edit this item and then configure permissions;




  - Choose **Allow editing** if you want others to be able to edit the file.
  - Uncheck **Allow editing** if you only want others to be able to view the file.

**If you own the file, or you have edit permissions, you can choose to stop or alter the sharing permissions.**

- Choose **the file or folder** you would like to stop sharing.
- Choose **Information** located in the upper-right corner in order to have the Details pane opened.
- Choose **Manage Access** and;
    - Choose the **X button** close to a link to disable it.
    - Choose **Can Edit or Can View**, and then choose **Stop Sharing**.
    - Choose **Can Edit** or **Can View** and then choose **Change to**…

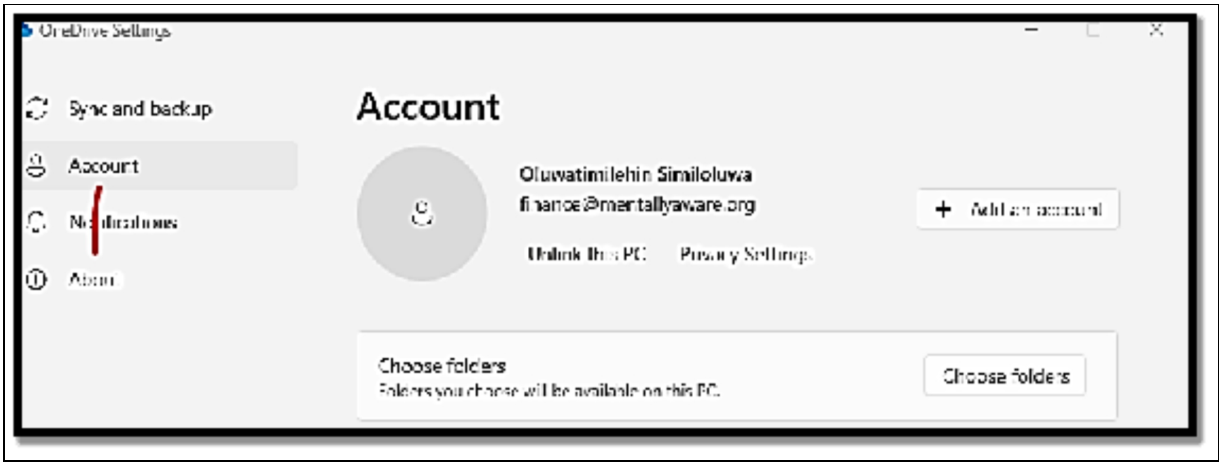
# Files On-Demand and Offline Access

Any OneDrive or OneDrive for Business account can be viewed in File Explorer by clicking the node for that account in the navigation pane. File Explorer displays all of the files and folders stored in that account because the Files On-Demand feature is by default turned on. The files themselves can be requested, but they are not downloaded until they are required. This could result in a slight lag between double-clicking a file and opening in the related program, depending on the file's size. Even while you can have instant access to hundreds of gigabytes of cloud-based information on a device with only a small portion of that space available for data storage, the trade-off is worthwhile. Once Files On-Demand is enabled, a green badge alongside each of the files or folders will show its availability status. Items that are being synced at the moment (or are pending sync because they have been opened) will be denoted by arrows that are rotating.

When you happen to be on a device that has just about enough storage, you can choose to sync the whole cloud file collection; all you have to do is ensure that there is enough disk space to take care of all the pictures, video clips, and also documents saved there. On devices with quite limited local storage, you can selectively synchronize folders in the cloud to the local device with this, files will be available even when you are not online.

**All files and folders are originally set as Available When Online by default.**

- When you double-click **an item** to download it, its status changes to **Available On This Device**. Select **Always Keep On This Device** from the context menu when you want one or more specific files or folders to always be accessible. It should be noted that any new files you save in a folder with this option selected are automatically designated as **Always Available On This Device**.
- With **File-On Demand enabled**, you can choose to either show or conceal files and folders in File Explorer. Open **the OneDrive Settings dialog** for the account you would like to alter, choose the **Account tab**,

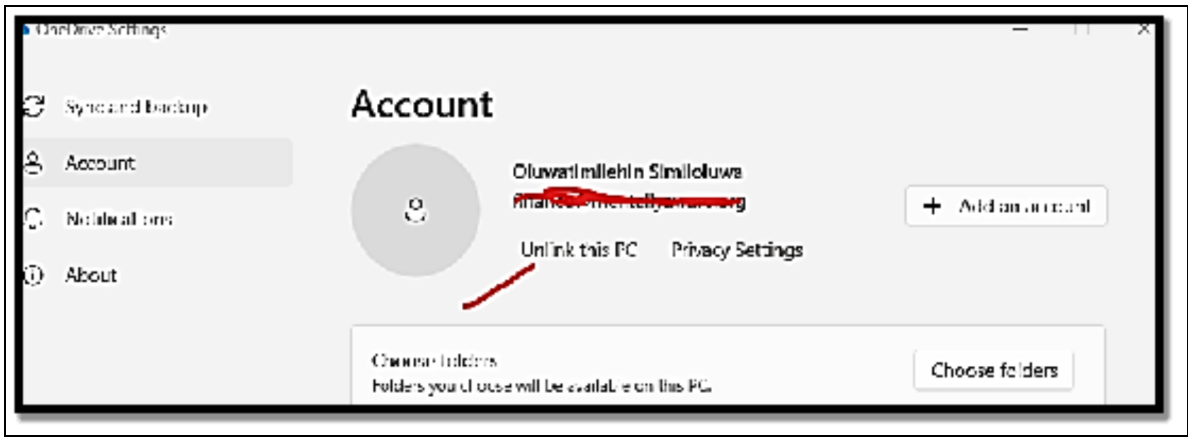



And then choose **Folders**.

By default, all the files and all the folders will be chosen. From the list shown, clear **the check box** for the ones you would like to keep online without having to show them in File Explorer. The OneDrive sync folders lack a Location tab in the settings window, in contrast to many other data folders in your user profile. Therefore, we advise you to carefully choose this configuration setting when you initially attach your OneDrive account to your PC. However, there is a rather easy workaround if you decide after the event (and after syncing many files) that you want to change the OneDrive folder.

- Right-click the OneDrive icon in the notification area and then choose Settings.

- On the Account tab of the dialog that pops up, choose **Unlink This PC**;



Need not fret, your local files and those that are in the cloud will not be affected. Once OneDrive has confirmed that your account has been unlinked, drag **the local folder**, and then move through the **OneDrive configuration once more**, indicating the folder that has the data folder you relocated as the sync location. When you are done with the configuration, OneDrive will then confirm that the files in the cloud are a match to the files in the new location. The process ought to go in a very swift manner with no loss of data whatsoever. You can also choose to disable the Files On-Demand feature if your preference is that in that setup, only files and folders that you select to sync from the cloud to the local device can be seen in File Explorer. If you would like to locate this setting,

- Choose the **OneDrive or OneDrive for Business icon** in the navigation pane just under Home. Then go ahead to choose **the OneDrive icon in the upper-right corner of the File Explorer,** located just at the top of the details pane, in order to open the sync status menu. Lastly, choose **the gear icon** in order to open the setting of **OneDrive**; on the **Sync and Backup tab**, choose **the down arrow** to the right of **Advanced Settings** in order to show its options, and then switch the **Files On-Demand to the off position.**

## OneDrive Security and Privacy Features

The cloud hosts more than half of the world's corporate data. Organizations employ a variety of cloud storage solutions, such as private clouds, file storage, and object storage platforms, to store production and backup data. In Microsoft settings, Microsoft OneDrive is a well-liked cloud file storage technology that offers simple syncing and sharing. OneDrive also provides several data protection measures that reduce cyber dangers, cut down on data loss, and enhance data governance. Discover the best practices for ensuring OneDrive security and learn how to safeguard data in Microsoft OneDrive using a variety of native capabilities. Microsoft OneDrive is as safe as any other cloud storage platform. The platform offers encryption for data shared and saved on it. Nevertheless, OneDrive is exposed to the exact same security risk

that poses a threat to other cloud applications with similar capabilities. These security concerns can bring about data corruption, loss, or theft. Below are some of the mistakes that can bring about the compromising of the cloud security of an organization and leave it quite vulnerable to data breaches.

- **Weak credential management**: One of the very common threats to OneDrive security is a direct consequence of human error. Making use of a very simple or widely-used password, like Password or 123456, makes it quite easy for attackers to break into your Office 365 account and have access to your OneDrive. However, passwords that are left on a piece of paper and in plain text in unsecured or public locations are prone to theft, which compromises your account.
- **Improper access control:** Another risk is not restricting the permissions for users within or outside your organization. Sharing files with the wrong accounts can also jeopardize their contents since someone can delete the data with ease, write unwanted changes to the files, or even infect the document with malware or trojans.
- **Outdated operating systems and applications**: When you fail to swiftly update or install the latest security patches on an operating system or application, it can give rise to vulnerabilities. Attackers can make use of such leakages to get into your system and also gain control of your machines. This can pose a threat to OneDrive security and affects other Microsoft Office 365 applications, Windows, and web browsers.
- **Poor firewall configuration**: The firewall keeps track of network activity and regulates incoming and outgoing traffic in accordance with a set of established rules. Cybercriminals may identify an open port on your system if your firewall is improperly set, allowing them to infect your machine. When using public Wi-Fi, keep that in mind, especially if you're connecting to your Office 365 account.
- **Delayed threat detection and response**: There are several security risks to OneDrive that go unnoticed or are neglected

for a long time. This postponed response gives the issue time to develop. A malware attack, for instance, can infect multiple files or machines as opposed to just one. In this instance, the loss of data is significant since it could have been contained if the breach had been handled sooner.

OneDrive security concerns are almost exclusively caused by human error. In actuality, an employee's error accounts for 85% of all data breaches. In light of this, OneDrive provides a number of measures that lessen the chance of security lapses and the danger of data loss.

## Threat monitoring

**Various built-in Microsoft tools are available to continue to scan and check your environment for incoming threats.**

- **Ransomware detection**: OneDrive alerts Microsoft 365 subscribers when a ransomware or malicious attack is checked.
- **Suspicious activity monitoring**: OneDrive security features continue to check accounts in order to prevent access that is unauthorized. Suspicious sign-in attempts are blocked and you get a notification in case an unusual activity is seen on your account.
- Virus scanning on downloads for known threats: You can choose to set up anti-spam and anti-malware engines in Windows Defenders so they scan documents anytime you download them in order to locate content matching an antivirus signature.

## Breach prevention

**You can make use of some of the native Microsoft features to prevent access that is unauthorized and bring down the chances of any form of cyber breaches.**

- **OneDrive encryption**: OneDrive adds robust encryption technology to data at rest and in motion. Disk-level encryption

can be used at rest and each file is encrypted with the use of a unique AES256 key. These keys are encrypted with master keys that have been saved in Azure key Vault. In transit, OneDrive encryption helps to protect network communications between users and data users with the use of transport layer security (TLS) encryption.

- **Access control**: Files and folders can be shared with certain users and you can also choose to define the role of each of the users.
- **Password-protected files**: If you are a subscriber of Microsoft 365, you can keep your files secured by asking for a password to gain access to them.
- **Expiring links**: In addition to protecting files with the use of passwords, you can configure an expiration date on the links you share with other users.
- **OneDrive Personal Vault**: Security issues with OneDrive are nearly always brought on by human error. Actually, 85% of all data breaches are caused by employee error. Given this, OneDrive offers a number of safeguards that reduce the possibility of security breakdowns and the threat of data loss.

## Data recovery

When data is lost, OneDrive's built-in features can assist you in recovering it. To ensure data recovery, you must use a third-party backup solution because these features have their restrictions.

- **Mass file deletion notification and recovery**: You will get an alert with recovery instructions if you delete a large number of files from your OneDrive.
- Version history for all file types: You can choose to restore a previous version of a file if you mistakenly deleted it or wrote something that you shouldn't have in it.
- **Ransomware recovery**: For up to 30 days after a ransomware attack, OneDrive for Business users can recover specific files or restore their whole OneDrive. Remember that this isn't a given, which is why you need a backup plan from a third party.

## Some other security recommendations

You can put some advice into practice to reduce the danger of cyber threats and breaches. To provide the highest level of data protection, these procedures complement the security features of OneDrive.

## Make use of a strong password

You must first and foremost make sure that your password is difficult. It must have a minimum of eight (8) characters and can include both lowercase and uppercase letters as well as special characters. Additionally, avoid using the same password across other accounts. Additionally, it is advised that you password-protect your OneDrive folder, so choose a strong password.

## Enable encryption on mobile devices

Enabling encryption on your Android or iOS device is needed if you would like to make use of the OnEDrive application. With this, your files will remain protected in case you misplace your device or someone gains access to it.

## Train your employees

Cyberattacks and social engineering ploys are becoming increasingly complex. Regular training updates your staff on the most recent security risks and teaches them how to protect their credentials. Additionally, they should avoid clicking on arbitrary links or downloading anything from unidentified sources.

## Control access permissions and privileges

Make that each user has the appropriate permissions, and keep an eye on access records. Passwords, credit card information, and other important files shouldn't be kept on OneDrive, especially in shared folders. Additionally, it's a good idea to restrict access to private information by limiting rights to those required for particular tasks. Additionally, administrators should not use their admin

credentials to send emails, modify documents, or share files on OneDrive.

Microsoft OneDrive's synchronization service, high availability, and user-friendly interface make it a potent cloud storage and collaboration platform. However, because OneDrive is one of the most dependable and secure systems available, individuals and businesses frequently select it. OneDrive security features include ransomware detection, Personal Vault, in-transit, and at-rest encryption, to name a few.

## Activity

1. Set up OneDrive for Cloud Storage.
2. What does File-on Demand mean?

# CHAPTER 23
# WINDOWS SUBSYSTEM FOR LINUX (WSL)

Without actually running a full Linux virtual machine, users can run Linux command-line tools, utilities, and unmodified ELF64 programs in Windows natively by using the new Windows Subsystem for the Linux compatibility layer feature. Although it was created as a tool for developers, the Windows Subsystem for Linux is also becoming increasingly popular among system administrators and in the field of cybersecurity. In fact, WSL is an entire compatibility layer for running an environment that looks and functions exactly like the Linux operating system. It goes well beyond simply running a Linux "bash" shell on Windows. It has made it possible for Windows users to run popular free command-line programs like "grep," "sed," and "awk" or any other ELF64 binaries on their preferred Linux distribution, which is typically available for free download from the Microsoft Store. As a result, we can now utilize Linux tools like bash, vim, and emacs on Windows operating systems with a Linux-like user experience without the need for a third-party POSIX-compatible environment like Cygwin.

Microsoft has definitely been pushing the boundaries of operating system research with the initial version of WSL, which means, version 1 or wsl.exe. Now it is no more about the operating system or having to take sides as a Windows or a Linux user and basically drills down to offering the end user the best possible tools in the market to solve their various problems and build applications irrespective of the underlying platform. **Below are specific points that further help to emphasize the gaps and certain parts that are filled by the Windows Subsystem for Linux;**

- **Resource consumption**: Virtual machines have actually been of great help and are not going away just yet, but then there are some resource overheads in terms of memory, CPU, and storage that come with it, whereas with the use of Windows

Subsystem for Linux, resource consumption on the underlying host is somewhat reduced. There is no need for you to spin up a virtual machine just because you would like to check some Linux commands if you have a bash shell running on the inside of the Windows Subsystem for Linux.

- **Access to Linux tools**: Running Linux binaries on Windows operating systems helps with the opening of whole new opportunities for Windows users to the Linux world by making most of the powerful Linux application tools available to them.
- **Cross-platform development:** The Windows Subsystem for Linux can be used by both developers and system administrators to create cross-platform software and tools.Core Net. Having said that, I don't even need to start a Linux virtual machine to test a project on Windows and then on the Windows Subsystem for Linux.
- **The right tool for the right job**: The idea is to make use of the very best tools notwithstanding the underlying platform. This simply means if you are not so comfortable with deploying a Nginx web server on Linux, then you are free to get that done on the Windows operating system inside a subsystem that enables you to execute Nginx just as though you are running natively on a Linux machine.
- **The Same user experience**: WSL provides not just integration but also offers a very seamless experience for Linux developers. Most times, a developer won't know that they are working on a Linux operating system but rather a translation layer running native Linux binaries at the top of the Windows operating system.
- **Secure isolation:** Since WSL is a subsystem, the applications being executed on it are basically running in a quite secure, isolated container, which is unable to compromise other applications on the host operating system.

The Windows Subsystem for Linux can be used by both developers and system administrators to create cross-platform software and tools. Core Net. Having said that, I don't even need to start a Linux virtual machine to test a project on Windows and then on the

Windows Subsystem for Linux. The Linux process /bin/bash is started when "bash.exe" is launched from the host Windows operating system. This Linux instance holds a data structure to keep track of all processes, threads, and runtime information. Such Linux instances have a "LX Session Manager Service" that manages their lifecycle. This service's function is to act as a broker to the Linux subsystem driver. It also assists with installations and uninstallations by synchronizing operations so that only one process may do each of these tasks at once.

A Microsoft Research team began working on a project dubbed "Drawbridge" in 2011. This project later introduced the PICO method, which was later included in Windows. Linux binaries can be stored inside a PICO process, which is a process-based isolation container with a limited kernel API surface. In order to imitate a Linux kernel, the container or PICO processes, along with lxss. sys and lxcore.sys, sometimes referred to as PICO provider drivers, carry out the translation of Linux system calls into NT APIs whenever you execute any operation on these Linux binaries. To put it simply, PICO providers deliver corresponding system calls for Linux to the Windows NT kernel and vice versa.

## Advanced WSL Configuration and Tips

Advanced configuration options are configured using the wsl. conf and. wslconfig files, both locally for each WSL 2 distribution (wsl. conf) and globally for all WSL 2 distributions (.wslconfig). Each settings option, when to use each file type, where to save the file, sample settings files, and tips are covered in this section.

**You can choose to set the settings or your already installed Linux distributions that will be instantly used each time you open WSL in two ways, by making use of;**

- .wslconfig to configure settings globally across every installed distribution running on WSL2.
- Wsl. conf to configure settings per distribution for Linux distros being executed on either WSL 1 or WSL 2.

The two file types are used for configuring WSL settings, but the location of the file, the scope of the configuration, and the version of WSL your distribution is executing all have an impact on the file type to choose. The version of WSL that is being executed will impact the configuration settings. WSL 2 executes as a lightweight virtual machine (VM), hence it makes use of virtualization settings that enable you to control the amount of memory or processors used which at times might be something you know if you make use of Hyper-V or VirtualBox.

**Wsl. conf**

- Saved in the /etc directory of the distribution as a Unix file.
- Used in the configuration of settings on a per-distribution basis. Settings configured in this file will only be added to the specific Linux distribution that has the directory where this file is saved.
- Can be used for distributions executed by either version WSL 1 or WSL 2,
- If you would like to get the /etc directory for an installed distribution, make use of the command line of the distribution with cd / to gain access to the root directory, then to list files or explorer. Exe. in order to see in Windows File Explorer. The directory path ought to look like: /etc/wsl.conf.

**.wslconfig**

- Saved in your %UserProfile% directory.
- Used in the configuration of setting globally across all installed Linux distributions being executed as the WSL 2 version.
- Can be used solely for distributions run by WSL 2. Distributions executing as WSL 1 will not be affected by this setting as they are not executing as a virtual machine.
- You can open Windows File Explorer and type %UserProfile% in the address bar to navigate to your%UserProfile% directory in PowerShell. Your home directory is normally your user profile, C: UsersUserName>. The directory path must resemble this: C: UsersUserName>.wslconfig.

Every time you run WSL, it will recognize the presence of these files, read their contents, and automatically apply the configuration settings. WSL will still launch normally even if the file is missing or has errors (such as incorrect markup formatting), even without the configuration parameters.

## The 8-second rule

For configuration setting adjustments to take effect, you must wait until the subsystem powering your Linux distribution entirely shuts down and restarts. Once ALL instances of the distribution shell have been closed, this normally takes 8 seconds. ou might believe that your configuration changes have taken effect right away if you run a distribution (like Ubuntu), make changes to the configuration file, close the distribution, and then relaunch it. This is not the case right now because the subsystem might still be active. Before starting again, you must wait for the subsystem to halt so that your changes have time to take effect. After exiting your Linux distribution (shell), you can use PowerShell's wsl --list --running command to determine if it is still active. If there are no operating distributions, you will get the response "There are no running distributions." The distribution can now be restarted to observe your configuration adjustments take effect. Using the command wsl --shutdown will quickly restart WSL 2 distributions, but it will also terminate all currently operating distributions, so use it with caution.

## Configurations settings for wsl. conf

Setting configuration for each distribution is done in the wsl. conf file. (For global settings of WSL 2 distributions see .wslconfig). The automount, network, interop, and user portions of the wsl. conf files are supported. (Keys are stated within a section, similar to. gitconfig files, following the conventions of.ini files.) The system/service manager "systemd" is used by many Linux distributions by default (including Ubuntu), and WSL has added support for it to make it even more like running your preferred Linux distributions on bare hardware. To enable systemd, you need WSL 0.67.6 or later. Use the wsl --version command to see your WSL version. **O**pen your wsl.

conf file in a text editor with sudo rights and add the following lines to the /etc/wsl.conf to enable systemd:

- [boot]
  systemd=true

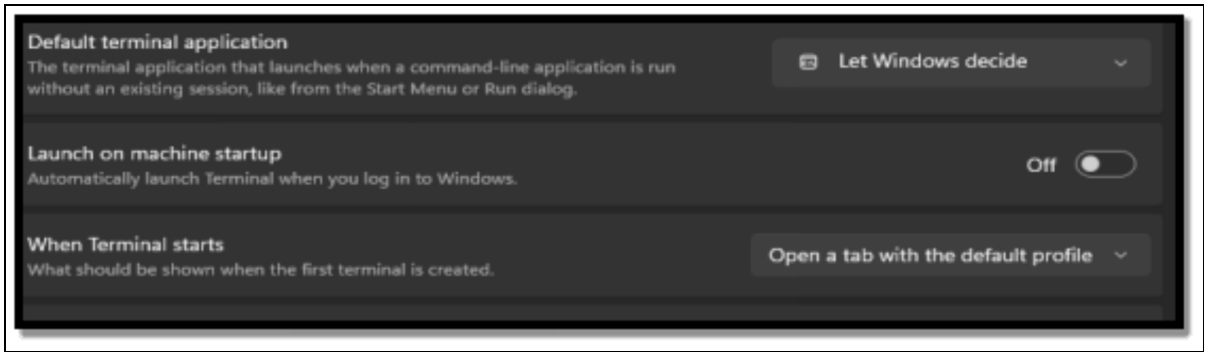
To restart your WSL instances, you will next need to shut down your WSL distribution using PowerShell's wsl.exe --shutdown command. Systemd ought to be operational after your distribution restarts. The command systemctl list-unit-files --type=service, which displays the status of your services, can be used to confirm.

## Running GUI Applications in WSL

The new features included in Windows 11 include improved performance and an updated user interface. The native support for running Linux GUI (Graphical User Interface) apps on the Windows platform, however, is one of the most notable enhancements. In order to be able to achieve this, there is a need for you to install Windows Subsystem for Linux 9WSL). It is a compatibility layer in Windows operating systems that enables users to execute Linux binary executables natively on the Windows operating system. Below are a set of instructions you can follow to install Linux GUI applications on Windows 11.

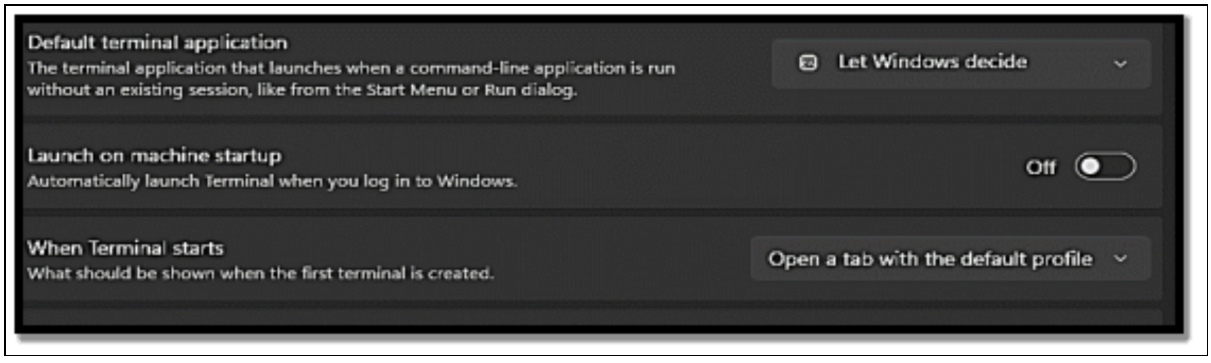
- **Install Graphics Drivers**: There is a need for you to first ensure that you have the necessary graphics drivers installed on your Windows System in order to execute graphical Linux applications. Microsoft has thoughtfully offered links to driver software for the three major GPU manufacturers; Intel, AMD, and NVIDIA. If you are unsure about the specific graphics model you are making use of, you can check online for this information. Once you have downloaded and installed the latest graphics drivers for your system, ensure you remember to restart your computer in order to have the installation completed.
- **Install WSL**: Follow the steps below to have WSL installed on your computer if you do not have this already;

- Open the **Terminal with admin authority on your system**.




- Switch **on the terminal and execute the command below**
  - wsl - - install
- Once the command has been executed, it will help install **WSL** on your system. Do ensure you wait a little for the installation process to be completed.
- Once this has been done, proceed with configuring Linus distro. There will be a need for you to create a username and password for your Linux distro. Once completed, restart your system.

- **Updating WSL Version to WSL 2**: If you are using WSL, there will be a need for you to update to WSL 2 on your system, as WSL 2 has included support for executing Linux graphical applications on Windows 11. If you would like to proceed with the update of the WSL version to WSL 2, follow the steps below;
  - Open **Windows Terminal as an administrator**.



    - Type the following command to update to WSL2 on Windows 11:
        - wsl - - update
    - If there is an update, it will download and also install the latest version of the WSL on your computer.
    - To get the update applied, there is a need for you to restart WSL. This can be done by simply executing the shutdown command. ( wsl - - shutdown).
- Installing Linux GUI Apps: Once you have installed all of the prerequisites, which also include graphic drivers and WSL2, you are then ready to install Linux GUI applications on Windows 11. Follow the steps below to get this done;
- Open **the Ubuntu Terminal.** To get this done, look for **Ubuntu in the Windows search bar and open it.** (You might have a need to download this from the Microsoft store if need be).
- Update the packages in your distribution to install the latest version of GUI applications on your system. For this, execute the following commands one by one and insert your **Linux password** in order to execute the command.
- Once the above has been completed, execute the terminal command for the application you would like to install.

Once you have successfully installed your Linux GUI application, you can easily execute and make use of it on your Windows 11 operating system.

**To get this done, follow the steps below;**

- Open the **Ubuntu Terminal**.
- Insert t**he name of the application** in the Ubuntu Terminal, and it will open the application.

# Integrating WSL with Development Workflows

Utilizing the benefits of both Windows and Linux for software development can be accomplished by integrating Windows Subsystem for Linux (WSL) into your development process. You can utilize Linux-based tools and utilities smoothly by running a Linux distribution alongside your Windows installation thanks to WSL. You

can incorporate WSL into your development workflow by following the procedures and factors listed below:

- **Enable and Install WSL**
  - Ensure you are making use of a compatible version of Windows (WSL2 requires Windows 10 or earlier).
  - Enable **WSL through the Windows Features settings**.
  - Install a **Linus distribution from the Microsoft store** (e.g. Ubuntu, Debian, and Fedora). You can have numerous distributions installed if need be.
- **Accessing the Linux Environment**
  - After installation, open the **Linux distribution** from the **Start menu** or make use of the wsl command in PowerShell or Command Prompt.
  - You will have access to a Linux terminal where you can execute Linux commands and gain access to the Linux file system.
- **File System Integration**
  - WSL enables you to gain access to your Windows files from within the Linux environment. Your Windows drives are basically mounted under /mnt/ (e.g., /mnt/c/ for your C: drive)
  - The file system integration ensures it is quite easy to work on projects that span both Windows and Linux environments.
- **Package Management**
  - Use the package manager provided by your Linux distribution for example; apt for Ubuntu, and dni for Fedora to install development tools and libraries.
  - Most Linux distributions have extensive package repositories with a wide range of software.
- **Development Environment Setup**
  - Install **your development tools, and editors** ( e.g., Visual Studio Code, Sublime Text, or Vim), and other software within the Linux environment.
  - This ensures that your development environment in WSL is consistent with your Linux-based toolchain.

- **Version Control**
  - You can use Git both within Windows (making use of Git for Windows) and also within WSL. Ensure that you configure Git with your credentials and any certain configurations.
- **Development Workflows**
  - You can make use of WSL for diverse development tasks like coding, running server applications, testing, and more.
  - Most developers find it quite convenient to make use of Linux-based tools and scripts for tasks like building, testing, and deploying applications.

# Activity

1. Execute GUI applications in WSL.
2. Integrate WSL with development workflows.

# CHAPTER 24
# WINDOWS 11 DEPLOYMENT AND MANAGEMENT

Given that Windows 11 is built on the same platform as Windows 10, you can employ the same deployment tools, scenarios, and capabilities that you do now for Windows 10. To account for changes in Windows 11 maintenance and support, you must examine and adapt your servicing plan. The following are some things to think about if you're searching for ways to optimize your strategy for delivering Windows 11 or if deploying a new version of an operating system isn't a process you're familiar with: You must first determine which of your current devices satisfies Windows 11's hardware requirements. The majority of equipment bought in the previous 18 to 24 months will work with Windows 11. To ensure compatibility, confirm that your device satisfies or surpasses Windows 11 requirements. Microsoft is actively working on analytical tools to assist you in comparing your hardware to what Windows 11 requires. Users using Windows 10 Home, Pro, and Pro for Workstations will be able to utilize the PC Health Check app to assess their eligibility for Windows 11 whenever it becomes generally available. Users of the Enterprise and Education editions of Windows 10 should rely on their IT managers to inform them when they are qualified for the update.

Expect this functionality to be integrated into current Microsoft technologies like Endpoint analytics and Update Compliance if enterprise organizations want to assess device readiness in their environments. When Windows 11 is made generally accessible, this function will be accessible. Microsoft is also collaborating with software development companies to make it easier for their products to support Windows 11 devices. Any large on-premises network can have Windows operating systems deployed using the Microsoft Deployment Toolkit (MDT). In contrast to Configuration Manager,

MDT is just useful for installing Windows; it is not a solution for continuing administration and upkeep. Despite this, it performs its task rather well and doesn't call for the same level of specialized knowledge as Configuration Manager. **MDT makes use of files saved in the Windows Imaging File Format (.wim) and supports two types of image files;**

- **Boot images**: used to start bare-metal computers, which are machines without a local operating system installed. Sometimes a memory stick is used to transfer this image to the target computers. A PXE-capable network adapter, however, can be used to access boot images across the network; in this case, the boot image is kept on a deployment server. Windows PE, a runtime version of Windows that is used to launch setup or, in this case, a program that is used to apply an operating system image, is included in the boot image.
- **Operating system images**: images that are independent of hardware and include an entire operating system. These OS images can be used directly from the Windows product DVD, in which case they are general; alternatively, you can generate a custom image by taking a snapshot of a running computer's hard drive, which may contain particular programs, drivers, and settings that are suitable for your company.

Microsoft refers to these installations as Lite-Touch Installations, and MDT can be used to carry them out with little assistance from an administrator. However, an administrator can design a task sequence to carry out Zero Touch installations in combination with Endpoint Configuration Manager. This strategy might be especially helpful when an organization needs to deploy a lot of Windows devices.

## Enterprise Deployment Strategies

It is impractical to manage PCs separately in larger enterprises. Administrators typically use centralized management software for a variety of tasks when deploying Windows on a large scale, including deploying Windows, managing updates for Windows and other

software, managing hardware inventory, tracking software licenses, and enforcing policies across an entire organization. However, they are increasingly being applied to personal devices that are used to access company services and store company data. Traditionally, these tasks pertained to PCs that were owned and maintained by the corporation. This solution often makes use of mobile device management (MDM) software, which may set security guidelines for a range of manufacturers' devices, including Windows 11-powered PCs. This choice is frequently referred to as BYOD (bring your own device).

## Windows Autopilot and Modern Deployment

A component of Microsoft's Intune mobile device management (MDM) and mobile application management (MAM) platform, Windows Autopilot is a cloud-based deployment and provisioning solution. Autopilot uses the default factory image included as part of a new PC from a hardware OEM to deploy Windows rather than depending on images. When the user turns on the computer, Windows Autopilot skips the (OOBE part of the setup and sends the device to the company's server, which configures it in accordance with the company's needs. Applications, compliance policies, configuration profiles, and security settings are all deployed throughout this provisioning process. Only machines that come preinstalled with Windows 10/11 Pro, Enterprise, or Education can use Windows Autopilot. Additionally, the users must have the authority to join the devices to Azure AD, and the devices must be assigned to an Azure AD group. What Windows Autopilot actually does is shown here.

For a network with lots of Windows 11 PCs, enterprise managers can employ a variety of third-party MDM and system management technologies. The tools from Microsoft that you might use in such an environment are included in this section. A hardware provider sells a group of brand-new computers to an organization. The new computers are subsequently shipped to the company (or directly to the consumers) by that vendor, who also uploads the device IDs of the new computers to the Autopilot service. The moment the user

turns on the computer, it establishes a connection with the Autopilot service and checks to see if its ID is present. The OEM previously uploaded the device IDs, therefore OOBE is now configured to adhere to the organization's Autopilot profile guidelines.

The user's device is Azure AD connected, signed up for Intune, and ready for use after entering their Azure AD account credentials. For businesses who already use Intune, using Autopilot is simple. An administrator can sign in using a specific keyboard combination and initiate an Autopilot Reset as necessary after new and existing devices are Autopilot-enabled. Any personal settings, apps, and files are deleted with this reset. Target computers are restored to a usable state and made suitable for usage by a new organizational user.

## Managing Windows 11 with Intune

As previously indicated, Intune gives administrators the ability to manage mobile devices (MDM) and mobile applications (MAM) for the devices used by their organization. In an on-premises network, Intune serves a similar purpose as Group Policy. Intune, however, operates differently. Administrators may use Intune to manage and configure a variety of devices running a range of operating systems, including MacOS, iOS, Android, and, of course, Windows 10 and Windows 11. This is in contrast to AD DS, which only supports Windows machines. Summaries of managed devices are shown on the Overview page in the Microsoft Endpoint Manager Admin center.

**Administrators can make use of Intune to get the following done;**

- **Configure devices**: Create and use device configuration profiles that can be used to set up Wi-Fi and VPN connectivity profiles, email accounts, device limits, firmware settings, and much more.
- **Verify compliance**: Create and implement compliance standards that mandate that devices adhere to certain security parameters. Devices that don't comply can be taken off of Intune. Compliance status is another tool available in Azure AD conditional access policies.

- **Deploy and configure apps**: Distribute, set up, and oversee a range of app kinds, including Store, Windows desktop, and line-of-business apps.
- **Secure devices**: To establish the required security settings for devices, such as disk encryption, firewall settings, account protection, and endpoint detection and response, use endpoint security policies.

The ability to manage and distribute programs to a range of operating systems is a key feature of Intune.

**Administrators can distribute the following program kinds on Windows 11 computers:**

- **Store apps**: An Intune administrator can establish a Store app deployment that directs users to the URL for the necessary app rather than requiring or even permitting them to install apps from the OS store for their device. After that, they can automatically make the software available to organization users.
- **Microsoft 365 Apps**: Administrators can distribute Microsoft 365 Apps, which include Outlook, Excel, Word, and other Office desktop applications, to users of Windows and macOS. Users of Windows can check to see which particular components are installed.
- **Microsoft Edge**: Administrators can roll out the new Edge browser to Windows or macOS devices via Intune. Using the respective app stores for iOS and Android, they can distribute Edge to those devices.

Administrators can set the parameters for the apps using App Configuration Policies after deployment. They can also set restrictions on how an app must be used while connecting to company data using App Protection Policies. These options control what a user can do with corporate data on their device and, more critically, whether or not the corporate data can be shared outside the company after being encrypted. Depending on the monitored device's operating system, these policies change.

# Group Policy Updates and Best Practices

Group Policy is used by Active Directory administrators to configure machines across sites, domains, or OUs. Group Policy Objects (GPOs), which are a set of settings that are applied to a user's device when they sign in, are made by an administrator. Although administrators must allow and configure only the Group Policy settings they want to apply to their company, there are thousands of them available. The administrator attaches a GPO to the appropriate container, such as an OU, after specifying the needed parameters. By connecting the policy to a container in a domain environment, Group Policy enables an administrator to instantly apply policy settings and limits to users and computers. In contrast to a workgroup, where equivalent Group Policy settings must be made on each machine where you want such restrictions to be applied, a centralized management technique is used.

**The use of Group Policy as an administrator can help with the configuration of the following aspects of computer and user settings:**

- **Software Settings**: helps you to deploy applications to specific computers or users.
- **Windows Settings**: helps with the configuration of scripts that run during startup and shutdown or when signing either in or out. Also helps with the provision of access to security settings that are quite important.
- **Administrative Templates**: gives users access to a large number of options that are organized into a variety of categories, including Network, Printers, System, and Windows Components. When Microsoft releases a new version of Windows or Microsoft Office, the settings that are already in use might be modified.

A GPO's Administrative Templates node can be modified, as was already explained. The underlying template files, also known as. admx files must be downloaded and installed by an administrator in order to achieve this. Microsoft offers a downloadable spreadsheet

listing the policy settings for the user and computer configurations contained with each. admx file. Since this spreadsheet is cumulative, it contains every policy setting that is applicable to all Windows 10 and Windows 11 editions. Each set's scope (machine or user), the registry value it controls, and whether a setting change necessitates a sign-off or reboot are all provided in the list. To use Group Policy, you don't require an Active Directory architecture or a Windows domain controller. The Local Group Policy Editor (Gpedit. msc) allows you to apply policies to specific Windows 11 devices. In this book, all of the examples are illustrated using this tool. Even if you don't require the strength of Active Directory or don't have access to the Group Policy Management console on a domain controller, you can still carry out the same action.

**The techniques used to set policies in a local group policy are substantially the same as those in an Active Directory domain. There are a few variations, such as the following:**

- Domain-based GPOs accommodate both preferences and policies. Preferences provide you the ability to set up default settings for the user or computer that a local user or administrator can modify. The Local Group Policy does not support preferences; it only supports policies.
- The Software Settings folder in the Local Group Policy Editor is still displayed but isn't active when used locally. Local Group Policy cannot be used to configure app deployment settings.
- While GPOs in a domain are linked to containers that often have an impact on several computers, local Group Policies can only be assigned to the local machine.
- GPOs related to the domain or OUs in which the computer resides may override any settings specified through a Local Group Policy on an AD DS domain-joined PC. To put it another way, domain-based GPOs take precedence over local GPOs.
- All users in the OU that the domain-based GPO is attached to can be the target of the GPO. Security Filtering, a feature, allows this behavior to be changed.

**Regardless of how you choose to implement those policies, you can generally utilize the Local Group Policy Editor to investigate the available choices.**

- Enter **gpedit in the Start search box**, then click **Edit Group Policy** to start exploring Group Policy.

Both the User Configuration and Computer Configuration branches of Group Policy contain a variety of user- and computer-related options. However, the distinction between user settings and machine settings is frequently hazy. Scanning them all is your best hope for finding the policies you require. There are a ton of helpful settings there, many of which can only be changed by manually altering the registry. Many hundreds of computer settings and even more user settings can be found in the Administrative Templates folders, which makes this task seem overwhelming. However, you can quickly scan the folder names in Local Group Policy Editor, ignoring the majority of them, and then scan the policies in each folder of interest. There are three options for each policy setting in the Administrative Templates folders: Not Configured, Enabled, or Disabled. In the local Group Policy objects, every policy setting is initially set to Not Configured.

- Open **Local Group Policy Editor** and double-click the desired policy setting's name, or click the **Policy Setting link** that appears in the extended tab's center pane, to modify it.

You can write your own comments on a policy in the wide box called "Comment" which is located near the top of the dialog for each setting. This space can be useful later when you are trying to remember why you modified a particular policy. The same information that can be found in the center pane of the extended tab is also available in the Help pane, which is located below the Comment area. Options pertinent to the current policy are available in the pane to the left of the Help pane.

- To navigate across a folder without opening and closing individual dialogs, use the **Previous Setting and Next Setting buttons**.

# Activity

1. Manage Windows 11 with the use of Intune.
2. What are Group policy updates?
3. What do Enterprise Deployment Strategies mean?

# CHAPTER 25
# DATA PROTECTION AND BITLOCKER

Bitlocker can be described as a Windows disk encryption feature that is designed to help with data protection by offering encryption for entire volumes. BitLocker addresses the threat of data theft or exposure from either stolen, lost, or devices that have been decommissioned in an inappropriate manner. BitLocker helps to provide maximum protection when it is used with a Trusted Platform Module (TPM). A TPM can be described as a hardware component that is installed in many devices and also works with BitLocker in the protection of user data so as to be sure that a computer has not been decommissioned appropriately while the system is offline. Not every device has a TPM, this is in no way a problem. On devices that do not have TPM, BitLocker can still be used for the encryption of the Windows operating system drive. Nevertheless, this implementation needs the user to insert a USB startup key to start the device or bring the device back from hibernation. An operating system volume password can be used to keep the operating system volume on a computer without the use of TPM. Both options do not offer the pre-startup system integrity verification offered by BitLocker with a TPM.

Furthermore, in addition to the TPM, BitLocker provides the option to lock the traditional startup process until the user provides a personal identification number (PIN) or inserts a removable device like a USB or a flash drive that has a startup key. These additional security measures offer multi-factor authentication and a level of assurance that the computer will not start or resume from hibernation until the correct PIN or startup key is presented. Data on a lost device or a stolen device is vulnerable to unauthorized access, either by executing a software attack tool against it or by the transfer of the hard drive of the computer to another computer. BitLocker will then help with the mitigation of unauthorized data access by enhancing file and system protections. BitLocker also aids in rendering data inaccessible when BitLocker-protected is either recycled or

decommissioned. **For BitLocker to function optimally, there is a need for the following hardware requirements to be met;**

- For BitLocker to make use of the system integrity check offered by a TPM, the computer needs to have TPM 1.2 or later versions. If a computer lacks a TPM, saving a startup key on a removable device like a flash drive will then be compulsory when enabling BitLocker.
- A device with a TPM ought to also have a Trusted Computing Group (TCG) compliant BIOS or UEFI firmware. The BIOS or UEFI firmware brings into play a chain of trust for the pre-operating system startup, and it must also have support for TCG-specified Static Root of Trust Measurement. A computer that does not have TPM has no need for TCG-compliant firmware.
- The system BIOS or UEFI firmware (for TPM and non-TPM computers) must offer support for the USB mass storage device class, which also includes reading little files on a USB flash drive in the pre-operating system environment.
- **The hard disk ought to be partitioned with two drives at the minimum;**
    - The operating system drive has the operating system and its support files. It must be formatted with the use of the NTFS file system.
    - The system drive has the files that are needed to load Windows after the firmware has made ready the system hardware. BitLocker is not enabled on this drive. For BitLocker to work optimally, the system drive ought not to be encrypted, must be different from the operating system drive, and must also be formatted with the FAT32 file system on computers that make use of UEFI-based firmware or with the NTFS file system on computers that make use of BIOS firmware. It is highly recommended that the system drive be approximately 350MB in size. After Bitlocker is switched on, it should have approximately 250 MB of free space.

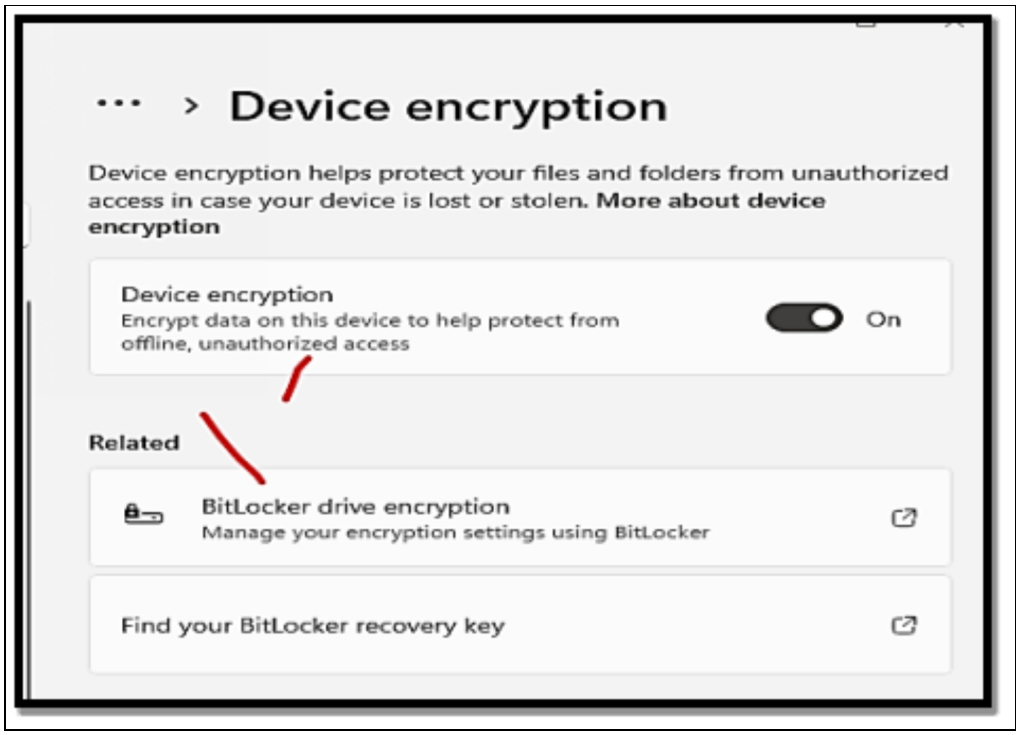
It is worth noting that TPM 2, 0 is not supported in the Legacy and Compatibility Support Module (CSM) modes of the BIOS. Devices with TPM 2.0 ought to have their BIOS mode configured as native UEFI alone. The Legacy and CSM options ought to be disabled. For more security, allow the use of the secure boot feature. Installed Operating System on hardware in Legacy mode brings to an end the OS from booting when the BIOS mode is altered to UEFI. Make use of the tool MBR2GPT prior to altering the BIOS mode, which prepares the OS and the disk to offer support for UEFI.

## Using BitLocker for Drive Encryption

A whole drive is encrypted using BitLocker. In contrast to Encrypting File System, you must either encrypt entire drives (or, more precisely, volumes) or nothing at all. BitLocker is a Windows component: It launches before Windows. On a drive with BitLocker protection, the Windows partition is entirely encrypted. Thieves cannot access anything on your laptop or hard drive, not even your settings or system files, even if they manage to get their hands on it. Similar to BitLocker, BitLocker to Go also supports external hard drives and flash memory sticks that are connected via USB. A feature of Windows 11 Pro is BitLocker. It is absent from Windows 11's Home edition. You must upgrade to Windows 11 Pro if you have Windows 11 and want BitLocker. Some users believe that BitLocker alone makes Windows 11 Pro worth the additional cost since their data is so precious.

**Here's how to use BitLocker to encrypt your hard drive:**

- Choose **the search icon and type Bitlocker**. Choose **Manage Bitlocker.**



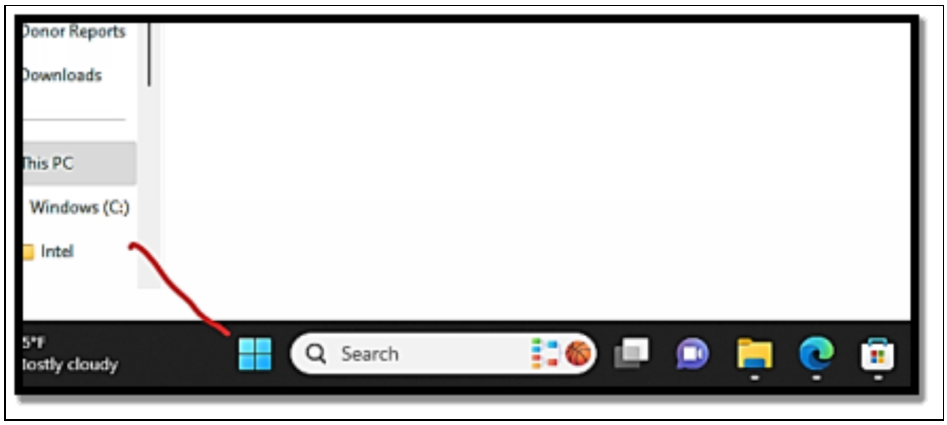

- Close to the drive (volume) you would like to encrypt, choose, or switch **on BitLocker.** The Bitlocker Drive Encryption configuration wizard displays, and Windows 11 checks if it meets the needed requirements for executing BitLocker. If your PC does not have a built-in Trusted Platform Module system, a message that says "**Your administrator must set 'Allow BitLocker without a compatible TPM**" will be displayed. The easiest way out of this is to execute the Local Group Policy Editor program, gpedit. msc.
- Select **Enter a Password**, insert the password you would like to make use of, and then choose **Next.** It is worth noting that the password ought to be at least eight characters long and must have both uppercase and lowercase letters, numbers, symbols, as well as spaces. Once you have encrypted your PC with BitLocker, the recovery key is just the only way for you to be able to gain access to your files when you have difficulties locking your PC. There are options for you to save the key to your Microsoft account, save the key to a file on your computer or USB flash drive, or print the recovery key.
- Selec**t how you would like to back up your recovery key,** and then choose **Next.**

- When you are asked to make a choice between encrypting a used disk space alone or the whole drive, make a decision and choose **Next**. If you would like the encryption to finish faster, select encrypt the used disk alone. Encrypting the whole drive may take many hours.
- Select the encryption mode you would like to make use of and then choose **Next**.
- Choose **the option to Run BitLocker System Check** and select **Continue as against Start Encryption**. The system check will make sure that BitLocker can read the recovery and encryption keys correctly before beginning to encrypt the drive.
- When you are asked to restart your computer, ensure you close all your open applications and files and then choose Restart Now. When you get back into Windows 11, BitLocker will then encrypt your drive instantly in the background. You can proceed to make use of your PC as usual. The icon of the BitLocker will be displayed in the system tray, on the right side of the taskbar. If you choose it, you will see the progress of the encryption process.

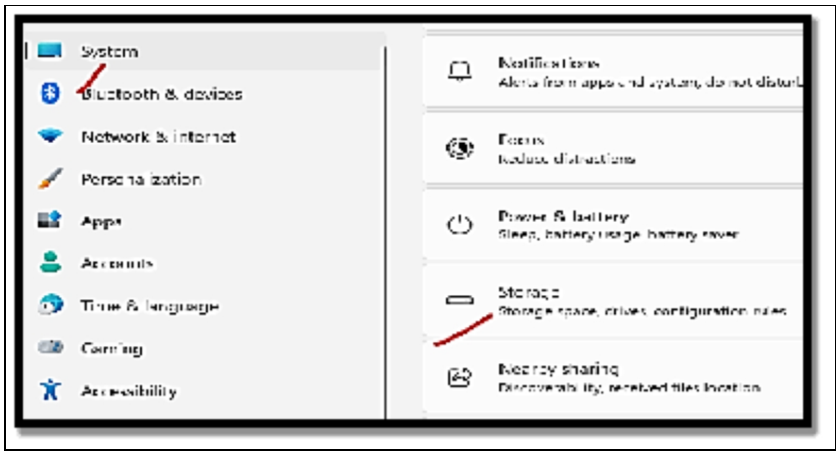
## BitLocker to Go for Removable Storage

The data on a portable USB device is encrypted using the Advanced Encryption Standard (AES) when you use BitLocker to Go on Windows 11. The password or recovery code is the sole way to access the drive. The procedures listed below must be followed if you wish to use BitLocker to Go on Windows 11. It should be noted that only computers running Windows 11 Pro, Enterprise, or Education can use the BitLocker encryption function. You must upgrade from Windows 11 Home to Windows 11 Pro if you want the BitLocker capability.

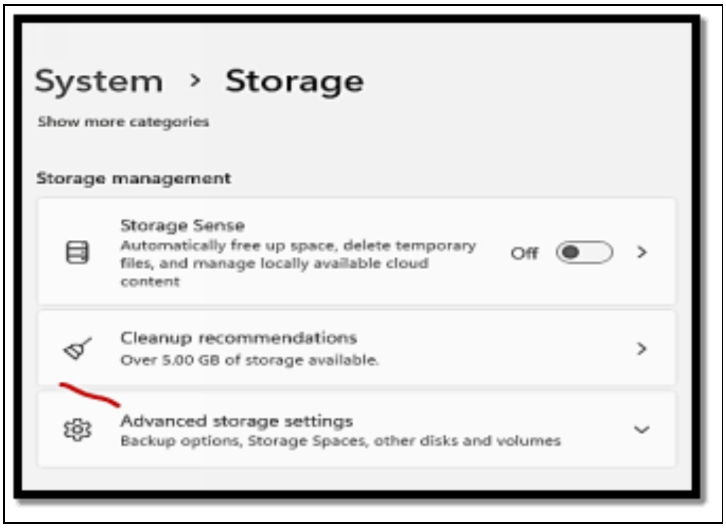
- Select the **Start button** or touch the **Windows key** to open the Start menu, then choose Settings. As an alternative, you can choose to make use of the keyboard shortcut **Windows key + I in order to open Settings directly**.




- When Settings opens, choose **System > Storage**.

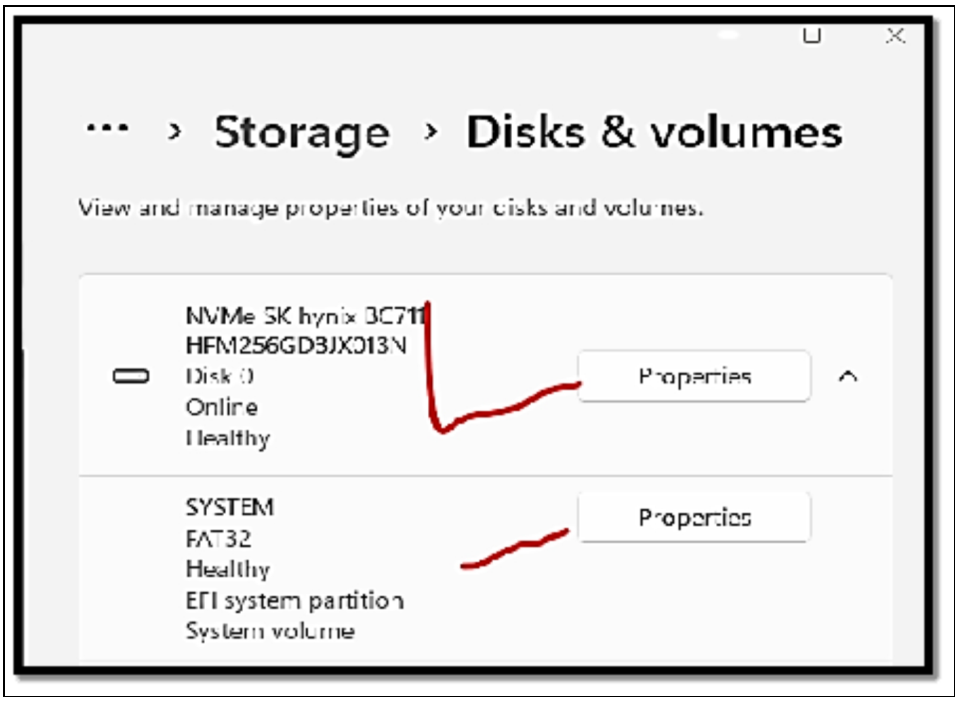



- Scroll down and choose **Advance storage settings**.




- When the menu expands, click **Disks & Volumes.**

- In the Disks and Volumes menu, choose **the drive you would like to enable Bitlocker encryption on**, then choose the **Properties button**.




- Scroll down and click the **Turn on BitLocker** link on the following screen.
- Find your chosen drive in the BitLocker Drive Encryption menu and choose the **Turn on BitLocker link.**
- Choose the **Use a password to unlock the drive box**, insert **the password you would like to use twice then choose**

**Next.**

- Choose **a preferred location to save your recovery key**. The recovery key will enable you to get into the drive if you forget your password. You can then choose to **Save to your Microsoft account, Save to a file, or Print the recovery key**.
- Once you have backed up your recovery key, choose **Next**.
- Choose **the Encrypt used disk space only** (faster and best for new PCs and drives) option and then choose **Next.**
- Choose the **Compatible mode** (best for drives that can be moved from this device) option and choose **Next**.
- Now choose the **Start Encrypting** button to commence the process of encryption.
- You will see a progress dialog when the encryption is proceeding. The amount of time it takes will vary depending on the amount of data and the size of the drive.
- When the encryption process is done, you will receive a notification to confirm; choose the **Close button**.

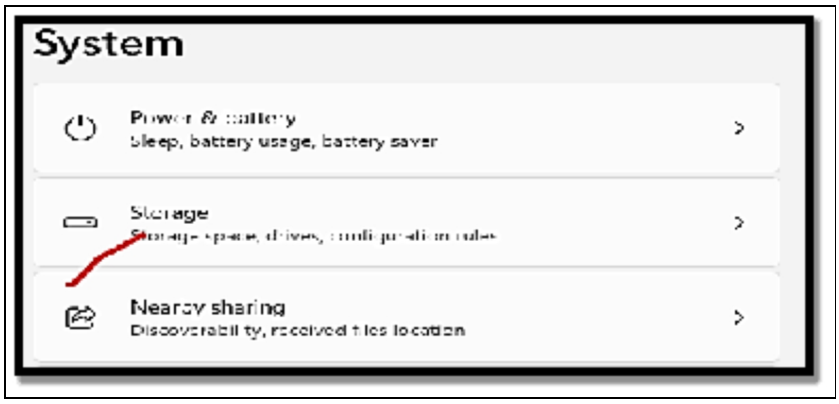
# Advanced BitLocker Configuration and Recovery

To add an additional degree of security and safeguard your device and contents from illegal access on Windows 11, BitLocker uses encryption. When utilizing encryption, the feature encrypts the data on the drive so that anyone lacking the necessary decryption key (your account password) cannot access it. Windows 11 Professional, Enterprise, and Education editions all include the security technology known as BitLocker. However, "device encryption," a constrained form of BitLocker, is included in Windows 11 Home. It functions just like the full version but lacks several sophisticated administration options and features, such as "BitLocker to Go." Additionally, all drives will be automatically encrypted when using device encryption, but the full version of BitLocker allows you to select the storage that will use encryption.

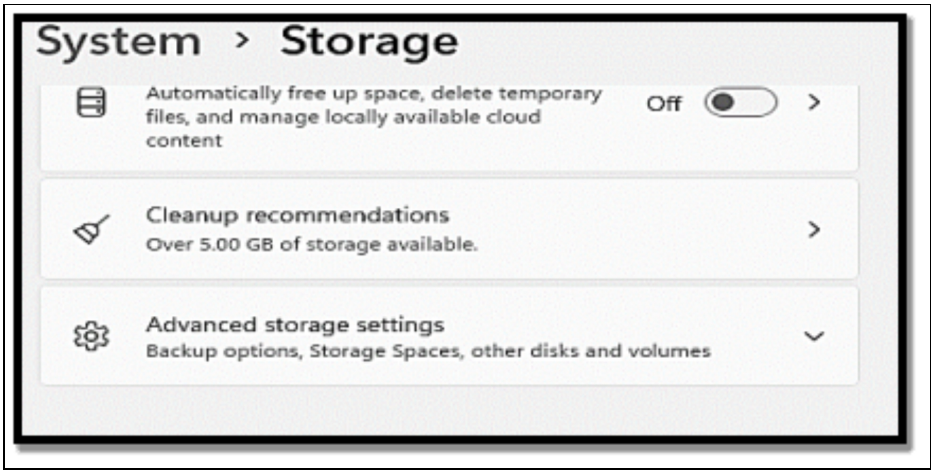
**Follow the steps below to configure Bitlocker in the Pro edition of Windows 11;**

- Open **Settings**.
- Choose **System.**

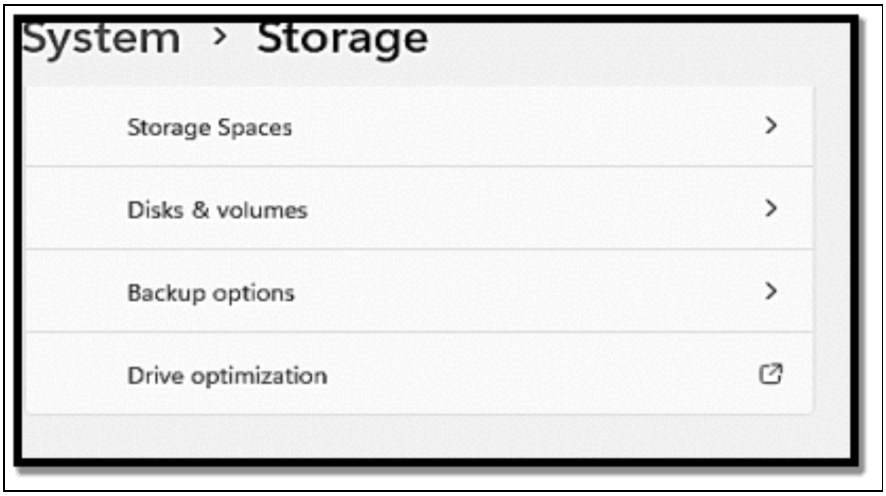
- Select the **Storage page on the right side of the pane.**




- Beneath the **Storage Management section**, choose **Advanced Storage Settings.**




- Choose **Disk & volumes**.



- Choose the d**rive with the partition to have encrypted**.
- Choose the **partition to enable encryption** and select the **Properties button**.
- Choose the **Turn on BitLocker option**.
- Select the **Turn on Bitlocker option once more**.
- Choose **the option to back up the recovery key for instance**, you can choose to **Save to your Microsoft account**. Note, however, that you can always locate the recovery key on your Microsoft account. Also, the option to save online is only available when the account is linked to a Microsoft account.
- Choose the **Next button**.
- Choose the **Encrypt used disk space only option**.
- Choose the **Next button**.
- Choose the **New Encryption mode option**.
- Stop to check the **Run BitLocker system check option**.
- Choose the **Restart Now button**.

# Recovery

If a BitLocker-protected drive cannot be unlocked normally, access can be recovered using the BitLocker recovery process.

**The following options are available in a recovery situation to regain drive access:**

- The user can supply the recovery password. Users can input the 48-digit recovery password that they printed, saved on a USB drive, or associated with a Microsoft account online if the business permits users to print or store recovery passwords in these ways. Only when using BitLocker on a PC that isn't part of a domain is it possible to save a recovery password online using a Microsoft account.
- Data recovery can make use of their various credentials in unlocking the drive. If the disk is an operating system drive, the data recovery agent cannot unlock it until the drive has been installed as a data drive on another machine.
- The recovery password can be retrieved from AD DS by a domain administrator, who can then use it to open the drive. It

is advised to store recovery passwords in AD DS to give IT expert's access to drive recovery passwords in case they are required. Enabling this recovery technique in the BitLocker group policy setting is required by this procedure. In the Local Group Policy Editor, go to Computer Configuration > Administrative Templates > Windows Components > BitLocker Drive Encryption > Operating System Drives and select how BitLocker-protected operating system drives can be restored.

## Causes of recovery

**When attempting to start the operating system drive, the following list of certain instances will result in BitLocker entering recovery mode:**

- When an attack is discovered, devices such as tablets and phones that solely utilize BitLocker Device Encryption or PCs that employ BitLocker Drive Encryption instantly reboot and enter BitLocker recovery mode. Administrators can configure the Interactive logon: Machine account lockout threshold to take advantage of this feature.
    - A group policy setting can be found in the **Local Group Policy Editor** under **Computer Configuration > Windows Settings > Security Settings > Local Policies > Security Options**.
- Changing the BIOS or firmware boot device order results in BitLocker recovery on devices with TPM 1.2. TPM 2.0-equipped devices, however, don't launch BitLocker recovery in this scenario. Because the OS Boot Loader is unaffected, TPM 2.0 does not view a firmware change in the boot device order as a security issue.
- Failing to boot from a network drive prior to booting from the hard drive.
- Docking or undocking a laptop. The portable computer's docking condition may occasionally (depending on the computer manufacturer and BIOS) be measured as part of the system and must be constant in order to verify the system status and unlock BitLocker. Therefore, if BitLocker is enabled

and a portable device is docked to its docking station, BitLocker may also need that device to be docked to the docking station when it is unlocked. On the other hand, if BitLocker is activated while a portable computer isn't docked, it could be necessary to detach the device from the docking station once BitLocker has been disabled.

- Alterations to the NTFS partition table on the disk also include creating, deleting, or resizing a primary partition.
- Switching off the support for reading the USB device in the pre-boot environment from the BIOS or UEFI firmware if making use of the USB-based keys rather than a TPM.
- Attempting to activate the TPM's anti-hammering logic by entering the personal identification number (PIN) incorrectly too many times. By delaying PIN submissions until after a predetermined period of time has passed, anti-hammering logic is a software or hardware technique that makes it more difficult and expensive to brute-force attack a PIN.
- Modifications to the master boot record on the disk.
- Alterations to the boot manager on the disk.
- Making use of a different keyboard that does not correctly insert the PIN or whose keyboard map is no match to the keyboard map assumed by the pre-boot environment. This problem can help with the prevention of the entry of enhanced PINs.
- Making changes to the Platform Configuration Registers (PCRs) the TPM validation profile relies on. For instance, including PCR[1] would cause BitLocker to detect the majority of BIOS setting changes, triggering BitLocker to go into recovery mode even when non-boot critical BIOS parameters are altered.
- Having a client machine with a BIOS, UEFI firmware, or option ROM component that isn't in accordance with the pertinent Trusted Computing Group standards. For instance, a non-compliant implementation can store erratic data (such as time) in the TPM measurements, resulting in various readings at startup and forcing BitLocker into recovery mode.

The BitLocker network unlock feature can be activated to provide the secondary authentication factor when the computers don't have an on-premises user to provide the additional authentication method, which is useful if software maintenance necessitates restarting the computer and two-factor authentication is being used. Unplanned or undesirable action has been used to characterize recovery. Recovery can, however, also result from a production scenario that was intended, such as managing access control. BitLocker can be made to recover before the machine is transferred to a new user when desktop or laptop devices are redeployed to various departments or employees in the company.

It is important to remember that finding out what caused recovery is advised before starting the recovery process. This might assist in preventing the issue from recurring in the future. For instance, new security policies for monitoring who has a physical presence can be implemented if it is found that an attacker manipulated the computer by gaining physical access. BitLocker reseals the encryption key to the current values of the measured components when the recovery password has been used to regain access to the computer.

## Activity

1. Encrypt your drive with the use of Bitlocker.
2. How do you go about advanced BitLocker configuration recovery?

# CHAPTER 26
# POWERSHELL SCRIPTING AND AUTOMATION

The simplest and easiest method to get to do most tasks in Windows 11 is to make use of the graphical user interface; the dialog and also the settings pages where you will be able to specifically define various preferences and also alter settings. But simply because this is most often the most recent mode doesn't mean it is the only way by which this can be done. There is always an alternative that you can make use of when it comes to exercising command with the use of the command line or by altering certain settings to the Windows registry. If you happen to be a system administrator or you are a desk technician, making use of command tools can be very useful; especially in the aspect of saving you lots of time when you have a need to get them incorporated into scripts. For certain tasks, making use of the command-line tool is just about the only way you have to get a specific job done and not just done but done well and in good time.

There is an option for you to perform command-line tasks in Windows making use of the venerable Command Prompt (Cmd.exe) or the most recent PowerShell. PowerShell which can be described as a . NET-based command-line shell and scripting language can be used with almost every aspect of Windows and is also now the default shell in all currently supported Windows releases, desktops as well as servers. There is no need for you to choose sides. Windows 11 provides Windows Terminal as a host for both shells, with the option to make use of more command line environments like Azure Cloud Shell and also the Windows Subsystem for Linux; making use of the recent console, you can with ease change between any of those mentioned shells by simply changing to another tab. In this chapter, you will get to learn about the introductory aspect of PowerShell language, you will learn about how

to write PowerShell for automation, and also how you can effectively manage Windows 11 with the use of PowerShell.

## Introduction to PowerShell

Microsoft talks about PowerShell as a cross-platform task automation solution that is made up of a command-line shell, a scripting language as well and a configuration management network. People who have been Windows administrators for some time can utilize PowerShell for the exact same kind of chores they would have done with the use of the Command prompt, and you can also make use of its scripting power for the automation of routine management tasks. If you are so used to making use of batch programs, VBScript, or JScript for automation of administrative tasks, you can keep your current scripting investment but make use of the advantage of the more capabilities that you can get with the use of PowerShell object orientation and .NET support as your scripting needs grows. It is worth noting that Windows 11 provides support for two versions of PowerShell. Windows PowerShell version 5.1 is a much older product and is designed mainly for the use of Windows and built on the .NET Framework v4.5. The Version 7 of PowerShell is built on .NET Core and is a cross-platform solution. PowerShell can load many traditional Windows PowerShell modules without making any changes; in cases where this cannot be obtained, PowerShell 7 has a Windows PowerShell Compatibility feature that enables the use of Windows PowerShell modules that need the complete .NET framework.

**Below are some of the major advantages of making use of the recent PowerShell and scripting platform over the older ones;**

- Integration with the Microsoft .NET Framework; Just like conventional development languages like C#, PowerShell commands and scripts have access to the diverse resources of the .NET Framework.
- Object orientation and an object-based pipeline; All PowerShell commands that make use of output as against plain text,

removing the need for text parsing when the output of one command offers input to a second.

- A consistent, discoverable command model; All of PowerShell's commands make use of a verb-noun syntax, with a hyphen coming in between the two components. Every cmdlet that reads information starts with Set. These and every other consistency ensure that the language is quite easy to learn and also to comprehend. Each cmdlet has a help topic that you can get just by typing "get-help" cmdletname(where cmdletname happens to be the name of a cmdlet). You can make use of a Whatif parameter to test the effect of a cmdlet before you commence running it.
- **Universal scripting capability**: A PowerShell script is simply a text file, with the extension.PS1, having PowerShell commands. Any command that is capable of being used in an interactive manner can be brought into a script. Structures of scripting like looping, branching, and variables, can also be used in an interactive manner which means being used outside the context of a script.
- **A focus on administrators**: PowerShell has features of special interest to system administrators like the ability to work with remote computers; gain access to system resources like folders, files, registry keys, events, and logs, and also the ability to commence and stop services.
- **Extensibility**: Administrators for developers can prolong the PowerShell language through the importation of modules packages of PowerShell cmdlets and some other items. There are modules for a variety of products made by Microsoft which also include Azure, Windows Server, and Microsoft 365. Administrators are also capable of locating PowerShell modules that work with cloud services from other providers other than Microsoft like Amazon Web Services, VMware, and Google Cloud.

## Getting the most from PowerShell

The default appearance of PowerShell provides a little command-line interface that looks just like that of Command Prompt. The label of

PowerShell and its logo in the title of the tab along with the copyright notice and the letters PS at the start of the command line also helps with differentiating its appearance. If you have been in this line for a while but are new to the use of PowerShell, the very first thing you might want to get done is to attempt the use of the familiar internal commands of Command Prompt.

Some of these items for example include; dir, cd, rd, pushd, and popd. Redirection symbols like > to send output to another file and >> to add output to a file, work as well, and you are able to pipe lengthy output toMore, just as you are getting used to doing in Command Prompt. PowerShell makes use of aliases in the mapping of Command Prompt commands to its own cmdlets. Hence, dir becomes an alias for the PowerShell cmdlet Get-Childitem; cd becomes an alias for PowerShell's Set-Location. You are at liberty to design your own type of aliases in order to simplify the typing of PowerShell commands that you often make use of. You can also employ the use of PowerShell to open executables, just as you would make use of just any other command-line shell. When you type regedit, for instance, it will open Registry Editor; when you type taskschd, it will open Task Scheduler. It is also worth noting that with the use of PowerShell, you can also see and modify keys and values in the registry without having to make use of the Registry Editor.

## Working with cmdlets

The main aspect of PowerShell's native vocabulary is a set of cmdlets, each of which has a verb, and is followed by a hyphen, and also followed by a noun. For instance, Start-Service. A cmdlet can be followed by just one or more parameters as the case may be, each of these parameters (if more than one) is preceded by a space and has a hyphen that is linked to the name of the parameter and followed by a space and the value of the parameter. For instance;

## Get-Process -Name explorer

Will bring back just any information about the running process named explorer that is currently being executed. Many cmdlets make

use of positional parameters. For example, the -Name parameter for Get-Process is positional. PoewerShell is expecting that it comes first hence you will be able to leave out -Name and simply indicate the names of the processes in which you are interested. If by any chance you happen to leave out the first positional parameter alongside its value, PowerShell will simply assume a value of *. For instance,

## Get-Process

**Will bring back the information as regards all processes that are running.**

In certain cases, if you leave out values for a first positional parameter, PowerShell will prompt you to provide the parameter. PowerShell does you the courtesy of having to prompt for the name of an event log. Event logs are large; it would not be very reasonable to request all of them at the same time.

## Making use of the Pipeline

The output of one cmdlet can be used as the input for another by using the pipe operator (|). As long as each cmdlet to the right of a pipe operator is aware of the output of the cmdlet to its left, you can connect multiple cmdlets together using the PowerShell pipeline. A cmdlet to the right of a pipe operator can perform operations directly on the properties or methods of the output of the preceding cmdlet since PowerShell cmdlets deliver full-fidelity.NET objects rather than text.

**The following paragraphs give instances of making use of piping for formatting, filtering, and sorting the output from different Get- cmdlets.**

- Formatting output as a list: The default output from so many Get - cmdlets is a table that shows just a few of the resultant properties of the object (about as many as the width of your display is most likely to accommodate). For instance, the cmdlet

## Get - Service

Brings a three-column display that has just the Status, Name, and DisplayName properties. In some cases, there will be a need for you to locate and understand the Format-List cmdlet, without parameters, is equal to Format -List- Property *; this is however not always the case.

## Generating an interactive graphical table

When you pipe the output to Out-Gridview, a graphic tabular display is created that you can simply filter, sort, and transfer into other apps like Excel that support tabular data. For instance,

**Get-Process | Select-Object * | Out - Gridview**

helps with the production of the output that can be compared with others. It should be noted that Get-Process is piped to Select-Object * before in this example since Out-Gridview, unlike Format-Table, lacks a -Property argument. All of the properties of the object that Get-Process returned are passed up the pipeline by Select-Object * to Out-Gridview. **With methods similar to those employed by numerous other programs, you can alter the contents of the Out-Gridview window:**

- If you would like to sort the display, choose **a column heading** then choose a **second time to reverse the sort.**
- To alter the position of a specific column, **move its heading.** You are also free to rearrange columns by right-clicking **just any column head**, picking **Select Columns**, and then making use of the **Move Down and Move Up buttons in the Select Columns dialog.**
- If you would like to take off columns from the display, right-click **any column heading**, choose S**elect Columns, and then make use of the << button in the Select Columns dialog.**
- To get a quick filter done, insert **text in the line described as Filter.** For instance, if you would like to reduce the display shown to processes with properties that have the word beta, insert **beta on the Filter line**.

- If also you would like to filter on one or more certain columns, choose the **Add Criteria button**. In the drop-down list that shows, choose checkboxes for the columns on which you would like to have them filtered and then choose **Add**.

## Filtering output

If you would like to filter output from a cmdlet, get it piped to the Where-Object cmdlet. With the use of Where-Object, you can choose to encapsulate filtering criteria in a script block, between curly braces.

## Sorting output

The Sort-Object cmdlet allows you to perform a range of helpful operations on the output of a cmdlet based on one or more of the resultant object's properties. Sort-Object sorts on the default property if you don't specify the -Property parameter. For instance,

**Get -Child item | Sort-Object**

The current directory's contents are sorted by Name, which is the default property in this situation. To sort on several properties, use a comma-separated list after -Property. Sort-Object starts with the first named property and works its way down, sorting items with identical values for the first property by the second property, and so on. Sorts are ascending by default; to sort in descending order, use the -Descending argument.

## Simplify keyboard entry with the use of PowerShell features

PowerShell is a wordy language that does not tolerate misspellings. Fortunately, it provides a plethora of tools that streamline and simplify the process of developing appropriate commands.

## Using and creating aliases

An alias is a different name for a cmdlet. PowerShell employs aliases to transform Command Prompt commands into their native

vernacular, such as cd to Set-Location. However, it contains many more solely for your typing convenience; for example, gsv is an alias for Get-Service. You can also make your own aliases. Type get-alias to check what aliases are currently available (including any you made yourself during the current session). (Alternatively, type gal, which is an alias for get-alias.) To see if an alias is available for a specific cmdlet, pipe Get-Alias to Where-Object, as shown below:

**Get-Alias | Where-Object { $_.definition -eq "Set-Variable" }**

This command string checks to see if an alias for the Set-Variable cmdlet is available. When you input this, you'll notice that PowerShell provides two options: sv and set. If you find Where-Object to be too long to type, consider substituting it with its alias,? Type set-alias name value to establish a new alias, where the name is the alias and the value is a cmdlet, function, executable program, or script. Set-Alias redefines the name if it already exists as an alias. PowerShell doesn't bother you with an error notice if the value is invalid—until you try to use the alias. The aliases you create are only valid for the current session. Include them in your profile to make them visible indefinitely.

## Recalling commands from the command history

PowerShell keeps track of your recent commands, making it simple to reuse (or alter and reuse) a command you've already input. Type get-history to view the history. An ID number is assigned to each item in the history. To bring an item to the command line, type invoke-history ID (where ID is the ID number). You can change an item on the command line before executing it. PowerShell keeps a history of commands that you can access using shortcut keys similar to those found in a Command Prompt session. The automatic variable $MaximumHistoryCount determines the number of history items maintained in a PowerShell session. That value is set to 4096 by default, which should be more than adequate for most people. If you discover that you require more, you can increase the variable's value. For example, to double the current session's default, enter

$MaximumHistoryCount = 8192. Add a variable assignment to your profile to adjust the history size for all sessions.

## Working with the file system

For relatively simple file-system activities, conventional Command Prompt commands may be sufficient and easier to use than PowerShell cmdlets. The built-in aliases allow you to stick to tried-and-true approaches. PowerShell recognizes the conventional single period (.) and double period (..) symbols for the current and parent directories, as well as a built-in variable, $Home, which represents your home directory (by default, identical to the%UserProfile% environment variable).

**However, the PowerShell cmdlets contain useful optional parameters:**

- -**Confirm and -Whatif:** When used with Copy-Item, Move-Item, Remove-Item, or Clear-Content, the -Confirm argument forces PowerShell to display a confirmation prompt before performing the command. (Clear-Content can be used to delete a file's contents.) When you use the -Whatif argument, PowerShell displays the outcome of a command without running it.
- **-Credential:** To specify security credentials for a task that requires them, use the -Credential argument. Within double quotation marks, follow -Credential with the name of a user. PowerShell will request a password.
- **-Exclude**: To make exceptions, use the -Exclude argument. For example, -Copy-Item directory1*.* directory2 -Exclude *.log copies everything from Directory1 to Directory2, excluding all.log files.
- **-Recurse**: The -Recurse argument instructs a command to execute on subfolders within a given path. Remove-Item x:garbagefolder*.* -Recurse, for example, deletes everything in X: Garbagefolder, including everything located within that folder's subfolders.

- **-Include**: You can limit the scope of a command by using the -Include argument in conjunction with -Recurse. Get-Childitem c:usersedbottdocuments* -Recurse -Include *, for example.A recursive listing of C: UsersEdBottDocuments is restricted to files with the extension xlsx.xlsx.
- -Force: The -Force argument forces the command to work on items that are normally inaccessible, such as hidden and system files.

Type get-help cmdletname, substituting the cmdlet name for the final argument, for further information on utilizing these arguments with Set-Location, Get-Childitem, -Move-Item, Copy-Item, Get-Content, New-Item, Remove-Item, or Get-Acl. The output contains the complete syntax as well as any aliases for the selected cmdlet.

## Writing PowerShell Scripts for Automation

Automation with the use of PowerShell is very important for various reasons, especially as regards Windows system administration and IT operations. **Below are some very important reasons why you should automate with the use of PowerShell;**

- Automation with the use of PowerShell enables tasks to be executed swiftly and in a consistent manner. Manual tasks that would take hours or even days can be done in just a few minutes or seconds.
- Automation ensures that tasks are done in a consistent manner each time they are executed. This brings about a reduction in the likelihood of human errors which can be caused by manual intervention.
- Workload increase comes with the growth of your IT environment, with the use of automation, you are able to effectively manage a large number of systems and devices without having to increase the administrative load on you.
- Scripts that have been automated can be used again in tasks that appear the same; this will save time and effort. This repeatability is especially useful for tasks that need to be done frequently.

- PowerShell offers huge capabilities for remote management. You can run scripts and commands on remote machines, which is quite essential for the management of distributed environments.
- PowerShell helps with the integration of different Microsoft and third-party tools as well as APIs. You can also choose to automate interactions with the use of Active Directory, Azure, Office 365, VMware, and lots more.

**With the above taken into consideration, below are steps to follow to automate tasks with the use of PowerShell;**

## Identify the Task to Automate

The first thing you will have to do in getting a task automated with the use of Powershell is to know the task that needs automation. This can either be a reprieve task, one that needs various steps, or one that is quite prone to errors. For instance, there is a need for you to automate the process of the creation of a backup for a specific folder on your computer every day at a specific time.

## Write the PowerShell Script

The next step is for you to write a PowerShell script that does the task. PowerShell scripts are usually written in the PowerShell language which is regarded as a scripting language that is designed for Windows. The script must include all the needed commands and instructions to get the task done.

## Creating a PowerShell Script

If you've used PowerShell, you've already run commands to Get or Set Windows configurations. Creating a script is the process of saving the commands in a.ps1 file. A.ps1 file includes a script that will be executed by PowerShell, such as Get-Help. That is a simple command that is not worth storing in an a.ps1 file, but Get-Date -DisplayHint Date might be. It should be noted that the default configuration in Windows for executing scripts in PowerShell is not to allow scripts to run. PowerShell enforces its Execution Policy, which

by default is Restricted. Type Get-ExecutionPolicy to see the execution policy. Also, in PowerShell, type get-help set-execution policy to get the help command. Finally, if you want to run PowerShell scripts, alter the execution policy with a set-execution policy unrestricted or a set-execution policy remote-signed, according to your needs.

When you begin writing these scripts, you may include one or more commands, and then you begin scripting (writing a series of commands that may be run) in PowerShell, saving your commands or tasks in a PS1 file. For instance, below is an example of a PowerShell script that creates a backup of a certain folder on your computer every day at 9:00 PM.

```
# Set the backup directory path
    $backupDirectory = "C:\Backups"
    # Create the backup directory if it doesn't exist
    if (!(Test-Path $backupDirectory)) {
        New-Item -ItemType Directory -Path $backupDirectory
    }
    # Set the source and destination paths
    $sourcePath = "C:\Data"
    $destinationPath = "$backupDirectory\Data Backup $(Get-Date -Format "MM-dd-yyyy").zip"
    # Create the backup file
    Add-Type -AssemblyName "System.IO.Compression.FileSystem"
    [IO.Compression.ZipFile]::CreateFromDirectory($sourcePath, $destinationPath)
    # Display a message indicating that the backup was created
    Write-Host "Backup created successfully: $destinationPath"
```

## Test the PowerShell Script

Once the script has been written, it is necessary for you to test it to ensure it works as it should. This can be done by executing the script manually and then verifying that it does what it should correctly. Save the backup script as a.ps1 file and run it from the PowerShell

console to test it. Check that the backup file is generated in the selected location and that the backup creation message is displayed.

## Schedule the PowerShell Script

The last step is for you to schedule the PowerShell script to execute automatically at the preferred time. This can be done with the use of the Windows Task Scheduler, which enables the scheduling of tasks to run at certain times or intervals. Open the job Scheduler and add a new job to run the backup script every day at 9:00 PM. Set the trigger to "Daily" and the time to 9:00 PM. Set the action to "Start a program" and enter the path of the PowerShell executable and the script file. Save the job and double-check that it works as planned.

## Managing Windows 11 with PowerShell

PowerShell is a very powerful tool that can be used for managing Windows 11. It enables you to automate tasks, configure various system settings, and perform administrative functions in a very effective manner. **Below are some of the very common tasks you can do with the use of PowerShell in a Windows 11 environment;**

- **Checking System Information**
    - Retrieve information as regards the Windows 11 system with the use of cmdlets like “Get-ComputerInfor” or “Get-WmiObject”.
- **User and Group Management**
    - Design, alter, or remove user accounts and groups with the use of cmdlets like “New-LocalUser”, "Set-LocalUser”, “Remove-LocalUser”, “New-LocalGroup”, and also “Add-LocalGroupMember”.
- **Software Installation and Updates**
    - Install and manage software packages with the use of cmdlets like “Install-Package”, or “Uninstall-Package”.
- **File and Folder Management**
    - Perform files and folder operations, like creating, copying, moving, renaming, and also removing files and

directories with the use of cmdlets lie “New-Item”, “Copy-Item”, “Move-Item”, ‘Rename_Item”, and “Remove-Item”.

- **Network Configuration**
  - Configure network settings, like IP addresses and network adapters, with the use of cmdlets like “Set-NetIPAddress” and “Get-NetAdapter”.
- **Security and Firewall**
  - Manage Windows Firewall rules and configurations with the use of cmdlets like “New-NetFirewallRule”, “Get_NetFirewallRule”, and “Set-NetFirewallRule”.
- **Power Management**
  - Control power settings, sleep configurations, and hibernation with the use of cmdlets like “Set-SleepConfiguration”.
- **Remote Management**
  - Enable and configure PowerShell remoting to run commands and prompts on remote Windows 11 devices with the use of cmdlets such as “Enable-PSRemoting” and Invoke-Command”.
- **Device Management**
  - Configure and manage device, drivers, and hardware settings with the use of cmdlets such as “Get-PnpDevice”, “Disable-PnpDevice”, and “Set-PnpDevice”.
- **Windows Defender**
  - Manage Windows Defender antivirus configurations, scans, and quarantine with the use of PowerShell cmdlets like “Set-MpPreference” and “Start-MpScan”.
- **User Interface Customization**
  - Customize the Windows 11 Start menu, taskbar, and any other UI elements with the use of PowerShell cmdlets and scripts.
- **Monitoring and Reporting**
  - Design scripts that are able to monitor system performance, produce reports, and automate routine checks and notifications.

Open PowerShell with administrative rights (Run as Administrator) and run the necessary cmdlets or scripts to use it for managing Windows 11. To automate complicated operations, you can write PowerShell scripts and run them immediately or as scheduled activities. To prevent unwanted repercussions, always use caution and properly test PowerShell scripts in a controlled environment before deploying them to production systems.

## Activity

1. What is PowerShell?
2. Write PowerShell scripts for Automation.
3. Manage your Windows with PowerShell.

# CHAPTER 27
# ADVANCED SECURITY AND WINDOWS HELLO

Advanced security measures are quite important in today's digital world in order to help with the protection of sensitive information, secure the identities of users, and defend an ever-evolving range of diverse cyber threats. With the increasing amount of sensitive data being saved and sent digitally, there is a growing need to guard this data against access that is unauthorized, theft, or any form of breach. Identity theft is a very serious concern and various advanced security measures are needed. Furthermore, cyber security threats are evolving at a very fast pace and are also becoming a lot more sophisticated. Conventional security means may not be sufficient to guard against threats like ransom ware, phishing, and advanced persistent threats. Windows Hello supports a variety of biometric techniques, including facial recognition and fingerprint scanning. These biometrics are unique to each person and provide an additional layer of security. Users can create a personal identification number (PIN) in order to gain rapid and safe access to their Windows devices. The PIN is not kept on the device and so cannot be easily guessed. Windows Hello for Business includes features such as Windows Hello for Business certificates and keys that improve security by utilizing hardware-based authentication and public key cryptography.

## Windows Hello Biometric Authentication

Windows Hello is a biometrics-based technology that allows Windows 10 and 11 users to authenticate and secure access to their devices, apps, online services, and networks using only their fingerprint, iris scan, or facial recognition. The sign-in mechanism is simply an alternative to passwords, and it is commonly regarded as a more user-friendly, safe, and dependable method of accessing critical devices, services, and data than standard password logins.

Since traditional passwords are difficult to remember, people either use easy-to-guess passwords or write down their passwords. People frequently use the same password (or variations thereof) across different sites and applications. Windows Hello and other biometric authentication technologies, such as Apple's Face ID or Touch ID, are intended to provide a more secure alternative to passwords by relying on technology that is more difficult to crack. Passwords, in a nutshell, are a pain. In this day and age of password overload (and human forgetfulness), security-conscious consumers recognize that using a fingerprint, face recognition, or iris scan to obtain access to devices, essential accounts, and data is likely to be a safer option. Nonetheless, the password "remains the most commonly used sign-in mechanism, but it is also a source of frustration for end users." Microsoft is collaborating with an increasing number of service providers to provide its consumers with a more convenient way to verify multiple important accounts with Windows Hello. All Microsoft Office products, as well as third-party tools like Dropbox, support Windows Hello. Windows Hello has also been incorporated into Google Chrome, allowing for payment authentication when using the browser under Windows.

Windows Hello has a low entrance barrier, but it does have specific system requirements. Windows Hello is compatible with Microsoft's Surface Pro, Surface Book, and most Windows 10 PCs equipped with fingerprint scanners or cameras capable of capturing two-dimensional infrared spectroscopy. Microsoft is also collaborating with device manufacturers to ensure uniform performance and security for all Windows Hello users, as well as establishing high-level benchmarks and reference designs to create baseline requirements. According to Microsoft, the acceptable performance range for fingerprint sensors is a false accept rate of less than 0.002 percent, while the acceptable range for facial recognition sensors is a false accept rate of less than 0.001 percent. This translates to 1 in 100,000 for fingerprint recognition and half that for facial recognition. (For comparison, Apple claims that the chances of deceiving Face ID are one in one million, while Touch ID is one in 50,000.)

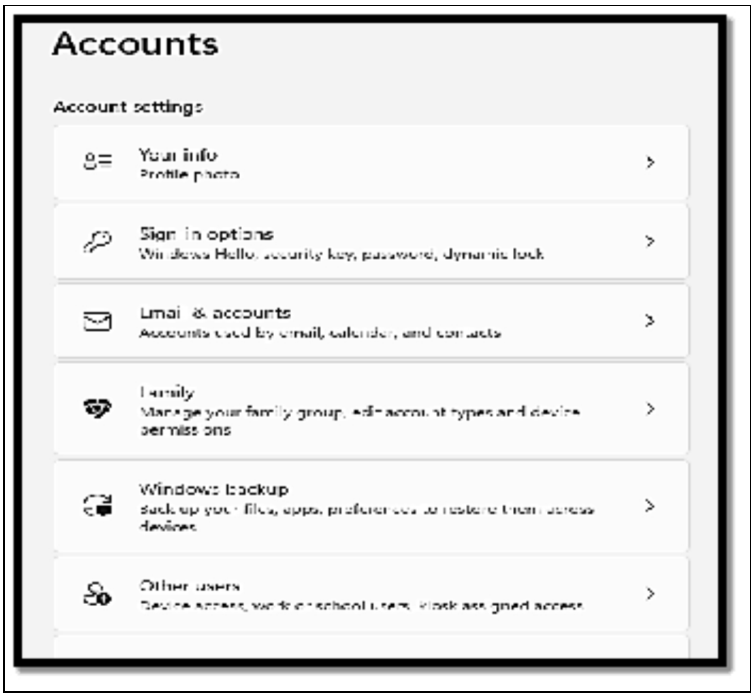
Furthermore, false rejection rates for fingerprint and facial recognition scanners that do not have anti-spoofing or liveness detection must be less than 5%. According to Microsoft's guidelines, false rejection rates for fingerprint and facial recognition scanners with anti-spoofing technology must be less than 10%. For those who are unfamiliar with the technology, liveness detection does exactly what it says: it identifies whether or not a user is a living human before unlocking a device or app. All sensors must incorporate anti-spoofing methods such as liveness detection, however, how these anti-spoofing features are configured is optional and varies between systems. **Follow the steps below if you would like to add Windows Hello as a sign-in option for your Microsoft account;**

- Navigate to the **Microsoft account page** and sign in as you would normally.
- Choose **Security > Advanced security options**.
- Choose **Add a new way to sign in for verification**.
- Choose **Use your Windows PC.**
- Follow the instructions that pop up to configure Windows Hellos as a method for signing in.

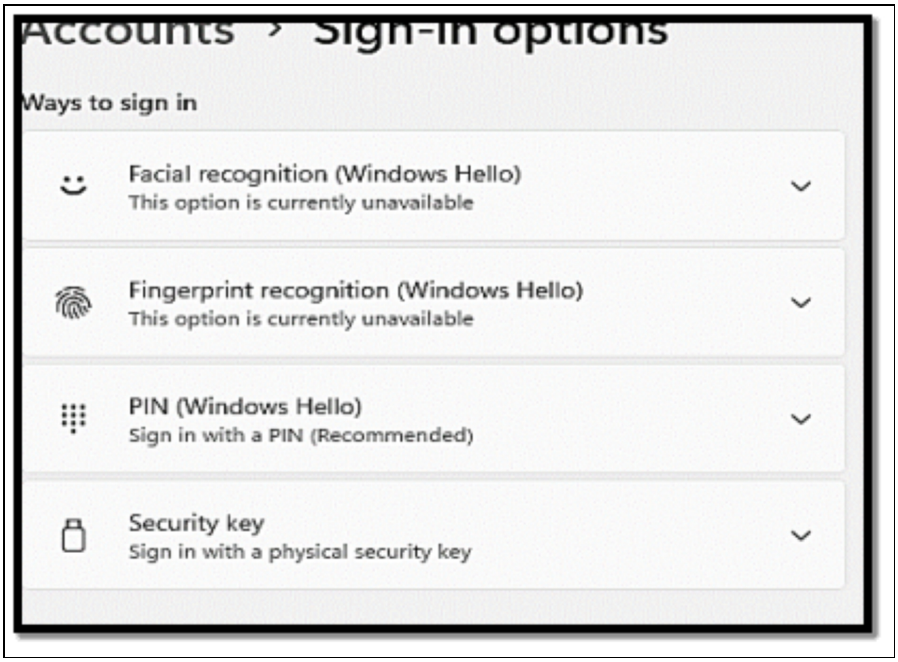
**Follow the steps below to configure Windows Hello and then sign in to your Microsoft account in Microsoft Edge;**

- Choose **Start > Settings > Accounts**

**> Sign-in options.**




- Beneath Ways to Sign in, choose a **Windows Hello item to add**.




## FIDO2 Security Keys and Authentication

Logging into a website or service with the usual username and password combination is no longer the best or safest method. As

fraudsters become more technologically savvy, data protection methods must evolve as well. This is where new authentication standards like FIDO2 can help. FIDO is an acronym that stands for Fast Identity Online. This acronym, with a number two appended at the end, is based on past work done by the FIDO Alliance, particularly in defining the Universal 2nd Factor (U2F) authentication standard. It is the FIDO Alliance's third standard, following the FIDO Universal Second Factor (UAF) and the FIDO Universal Authentication Framework.

FIDO2's major goal is to remove the use of passwords on the Internet. It was created with the goal of introducing open, license-free standards for safe passwordless authentication over the Internet. The FIDO2 authentication procedure replaces the traditional dangers associated with a login username and password with the FIDO2 login standard. As a result, it safeguards against common online threats such as phishing and man-in-the-middle attacks. This standard employs public-key cryptography to ensure a safe and user-friendly authentication method. To do this, the FIDO2 standard employs a private and public passkey to validate each user's identity. To use FIDO2 authentication, you must first register with a FIDO2-supported service. While the world's largest platforms, such as Apple, Google, and Microsoft, support FIDO, they are not the only driving force behind the FIDO Alliance, which is working with hundreds of firms worldwide to make simpler, stronger authentication a reality.

**To enable passwordless sign-ins, you must first complete the following steps:**

- There is a need for you to fill out the appropriate registration form and then select a FIDO2 authenticator which can either be a FIDO2 device or a well-known platform module).
- The service will then produce a FIDO2 authentication key pair.
- Your FIDO2 authenticator will send the public key to the service, while the private key that has sensitive information will remain on your device.

Once the secure communication path is enabled, the configured credentials are saved permanently, giving room for later logins.

**The next time you would like to log in to any of the services offering support for FIDO2 standard, take the following steps;**

- Provide your username as well as your email address.
- The service will provide you with a cryptographic challenge.
- You can make use of your FIDO2 authenticator so sign the challenge.
- The server of the service will then verify the response you give and also grant you access to your account.

**Below are ways in which you can make use of FIDO2 in your everyday life;**

- Platform authenticators are installed in employees' cell phones, tablets, or laptop computers, which feature cryptographic hardware parts and biometric capabilities. A platform authenticator can be an Android smartphone, a Windows 11 device with Windows Hello, or an Apple device with Touch ID or Face ID capabilities.
- Cross-platform authenticator. In this situation, authentication is based on a specialized physical USB, NFC, or Bluetooth security key that allows you to log in to services by putting your key into your device's USB slot or by pressing a button on the authenticator.

The major advantage of FIDO2 authentication is that it reduces cybercriminals' attack window significantly. Attackers will need a FIDO2 authenticator, which is literally always by your side in the form of your device or biometrics, to access your sensitive private information. If you use numerous FIDO2-compatible sites, you will benefit from a more streamlined experience because you will not have to remember various login details and passwords for each of your accounts. The FIDO2 U2F security key is compatible with all supported platforms, providing optimum security and user convenience.

# Windows Hello for Business

Windows Hello for Business can be described as a tool that enables you to unblock your device with the use of biometrics or a PIN. It allows you to gain access to your device with the use of fingerprint, facial recognition, and iris recognition. Each one of these has its own strengths and weaknesses hence be sure that all of the above-listed security features have been well-checked when you are about to register. Note that this feature also allows for the use of multi-factor authentication (MFA) which will help to ensure that your device is well secured. With the above description, you might be wondering about what makes this different from the conventional Windows Hello, the Hello for Business is actually more secure. It can be used for both on-premise and cloud resources. For instance, you can choose to make use of it with Hybrid Azure Active Directory-joined, Azure AD, as well as the Azure Active Directory-joined devices.

**The steps below give a hint into how Windows Hello for Business works;**

# Registration

This is the phase where the device gets to register with an identity provider (IDP). Simply put, an IDP can be described as a special service that helps with the storage and management of your digital identity. For instance, assume a third-party website prompts you to log in to a specific tool with the use of your Google account, in this case, your Google account becomes the identity provider.

It is however worth noting that each Windows Hello for Business deployment option has a varying identity provider. For on-premise deployments, the identity provider is often Active Directory Federation Services (AD FS). Meanwhile, Azure Active Directory is often the identity provider for cloud and also for hybrid deployments.

# Provisioning

Upon the completion of the registration, you can now proceed to configure the Windows Hello for Business tool. In this section, you

get to choose the different methods you would like to employ in unlocking your device, for instance, the use of biometrics or a PIN. Once done, you ought to be ready to log in to your device making use of your preferred method. At every point when you log in, the identity provider will ensure it verifies your identity.

## Why use the Windows Hello Business tool?

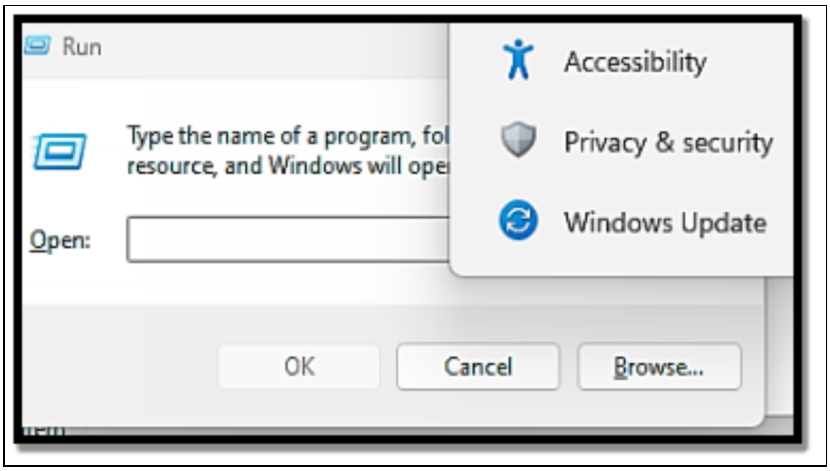
- **Certificate-Based Authentication:** Unlike Windows Hello, the Windows Hello for Business tool makes use of certificate-based authentication. This process makes use of a digital certificate in the identification of a user before giving them access to an application, a network, or even a resource.
- **Reduced Number of Password Resets**: It is quite common for most employers to forget their login credentials. Hence, this means there might be a need for administrators to perform frequent resetting of the password. However, Windows Hello for Business multi-factor authentication can make sure that you get to unlock your device in more than just one way. With this, it is highly unlikely that you would end up having to lock yourself out of your device and have a need to ask for a password reset.
- **SSO Support:** Unlike Windows Hello, the Windows Hello for Business tool provides support for single-sign-on (SSO) functionality. With the use of SSO, you are able to sign in to various services with the same set of credentials.

## Deploying Windows Hello for Business

You can enable Windows Hello for Business with the use of the Local Group Policy Editor (LGPE).

**Below are the steps you ought to follow;**

- Tap **Win + R** for you to open the Run command dialog box.




- Type **gpedit. msc** and then tap **Enter** in order to have the LGPE opened.
- Move to **Computer Configuration > Administrative Templates > Windows Components > Windows Hello for Business**.
- Click **twice on the Use Windows Hello for Business** option on the right-hand side.
- Choose **Enabled** in the top-left corner. Lastly, touch **Apply and then tap OK.**

Aside from enabling the tool, you can also choose to configure certain configurations in the LGPE. For instance, you can choose to configure the tool to make use of the PIN recovery. Furthermore, you can also opt to make use of a certificate for on-premise authentication.

**Below are the steps you can take to configure additional Windows Hello for Business settings with the use of LGPE;**

- Open the **Local Group Policy Editor** just as you have done in the above outline.
- Locate **Computer Configuration > Administrative Templates > Windows Components > Windows Hello for Business**.
- Choose any of the options on the list except for the **“Use Windows Hello for Business.**

- If you would like to enable the option you have just chosen, choose **Enabled** on the following screen. Lastly, touch **Apply and then tap the OK button**.

There are several methods for deploying Windows Hello for Business. The process for deploying it for cloud devices will be determined by your organization's cloud-based identity and access management (IAM) provider. Azure AD is an example of an IAM.

There are numerous approaches for deploying the tool to on-premise devices as well. To start, go to the Microsoft website and look at the infrastructure requirements for deploying Windows Hello for Business. Then, read the Windows Hello for Business Deployment Tips to learn how to use this product in your organization.

# Activity

1. What is Windows Hello Biometric Authentication?
2. Briefly explain the function of Windows Hello for Business and state the difference between Windows Hello and Windows Hello for Business.

# CHAPTER 28
# PERFORMANCE MONITORING ANALYSIS

When it has to do with computing, computer performance can be described as the amount of practical work done by a particular computer system. Outside some very special contexts, computer performance can also be estimated in terms of accuracy, efficiency, and speed of executing computer program instructions.

**When it comes to high computer performance, one or more of the factors below might be involved;**

- Short response time for a given piece of work.
- High throughput (the rate at which the work is being processed).
- Low utilization of computing resources.
- Fast compression and decompression of data.
- High availability of the computing application or system.
- High bandwidth.
- Short transmission time for data.

The way a computer chooses to perform can be checked in measurable, technical terms, with the use of one or more of the metrics listed above.

**With this, the performance can choose to be;**

- Compared to other systems or the exact same system before/after changes.
- In absolute terms, for instance; for the fulfillment of a certain obligation.

It is true that sheer speed can increase productivity, particularly for tasks like editing and converting large video files, which can take only a few minutes on a high-powered workstation but an hour or longer on a low-end laptop. Even after the workday is finished,

having a fast PC can add a little more enjoyment to life. Just ask any dedicated gamer how much time they have devoted to frame rate mania. Windows frequently acts as an innocent bystander when it comes to accelerating processes. If the hardware you're using is up to the task you're asking it to complete, the performance of a PC running Windows 11 out of the box should be adequate. A low-power mobile processor on a cheap laptop will almost surely have trouble with a CPU-intensive task, like processing videos, for example. However, even a workstation-class PC might perform poorly if a significant subsystem is malfunctioning or Windows is improperly set up. Similar to its predecessors, Windows 11 provides Task Manager and Resource Monitor, two useful tools for tracking the system's performance in real-time. Through many iterations of Windows, Task Manager has been a constant. It can be used to stop stubborn processes and disable programs that shouldn't start up. Additionally, Task Manager has useful performance-monitoring capabilities (more on that in the following chapter). You may use a sophisticated tool called Resource Monitor to help you focus on performance issues with even greater specificity. These programs work together to help you monitor your computer's CPU, memory, disk activity, and network utilization.

## The major cause of performance problems

**People who claim that their Windows computer is slow are typically frustrated by having to wait unexpectedly. If a task is taking an exceptionally lengthy time to finish, one of the following factors—in no particular order—is most likely to blame:**

- **Lack of or inadequate hardware resources**: Microsoft's stringent compatibility standards for Windows 11 PCs should guarantee that the base performance is satisfactory. However, more taxing operations, like transcoding digital files, might strain some computers to the limit. You should be able to spot regions where hardware resources are being overworked.
- **Defective hardware**: When they cause system failures, memory and disk defects are the most evident, but hardware-

related issues can also slow down performance. To find out what diagnostic tools are available, contact the maker of your hardware.

- **Outdated or flawed device drivers**: The PC and device manufacturers are in charge of providing drivers for the many hardware parts that go into their hardware. Windows might install a generic driver rather than one created specifically for that device if you perform a clean install. After a quick driver update, many performance issues disappear instantly. (However, don't automatically assume that a newer driver is superior to an older one; every driver update has the potential to introduce new issues.)
- **Out-of-control processes or services**: Occasionally, a software or background process that usually functions flawlessly will spiral out of control and use up all available CPU time, memory, or other system resources. Naturally, all other duties are performed slowly or cease altogether. A crucial troubleshooting skill is the ability to recognize and terminate this kind of process or service and stop it from happening again.
- **Malware**: Spyware, Trojan horses, viruses, and other types of unwanted software can seriously harm a system's performance. A system that displays performance issues that are otherwise undiagnosed should be checked for the presence of malware.

If one could just open Registry Editor, create a new DWORD value called MakeEverythingGoFaster, set its value to 1, and then instantly kick a system into overdrive, that would be amazing. Unfortunately, the approach that consistently produces the best results is much less magical: Use high-quality hardware, ensure that all devices are running the most recent versions of their drivers, have plenty of RAM, and leave enough free disk space to accommodate a sizable paging file, have a fast internet connection, and keep your system updated with Windows Update's security and feature updates.

# Resource Monitor and Task Manager Advanced Features

## Resource Monitor

Resource Monitor provides both real-time and historical readouts of critical performance parameters. Resource Monitor, like Task Manager, can show you in minute detail what each activity is doing. You may start Resource Monitor by searching for it in the Start menu or by typing perfmon /res into a Command Prompt window. The quickest way, though, is to click the link on the Task Manager's Performance page. (The link is at the bottom of the tab in the first release of Windows 11, version 21H2; in version 22H2, it's hidden behind the See More menu—the three dots to the right of the Run New Task button in the upper-right corner.) This option provides a more natural manner of investigating performance issues: Begin by taking a short look at Task Manager's Performance tab, and then, if more information is required, use Resource Monitor. Tabs are used to arrange information in Resource Monitor. The Overview tab displays charts that provide a visual overview of real-time performance in four areas: CPU, disk, network, and memory. Matching tables show specifics for each of these four areas on a per-process basis. (Unlike Task Manager, Resource Monitor does not provide GPU performance information.) You can go to a new context and focus on a specific sort of resource usage by using the tabs at the top of the Resource Monitor window. Each tab's basic layout is similar and comprises a few common features. One or more tables contain information about the resource highlighted on that tab. The key table is the first table on each page; it displays a list of all processes that are currently using the selected resource, with a check box to the left of each process. The main table at the top of the Overview tab lists all ongoing processes in a format similar to the Task Manager's Processes page. Choosing one or more processes from the key table helps with the filtering of the data shown in the tables that show underneath it, displaying just the activity that is linked with that same process. An orange heading shows at the top of each detail table, showing that the data shown has been filtered,

and an additional orange line shown in the graphs on the right helps to show just how much of that resource is currently being used by the chosen process.

The CPU, Disk, and Network tabs also work in a similar manner, providing more details that are more of use to programmers. The memory tab displays a map of the memory usage that is being used without any regard to the processes chosen in the main table. Resource Monitor is overkill for almost all performance troubleshooting tasks. Nevertheless, it shines when there is a need for you to see the specific process or file that is causing an unexplained burst of process. It is also quite invaluable for tracking down the name and the location of a certain file that Windows is making use of with a specific process and action. Whenever the resource monitor is active, its display can be very annoying to go after. It doesn't matter if you are not directly working with a program, Windows is always busy with its own housekeeping and maintenance duties, writing information to various log files and to the page file, reading and writing data to the registry, and also calling on various Windows system process for the management of memory and the file system. If all you are attempting to do is figure out what might be happening when you execute a certain task, you can make use of the two options on the Monitor menu to reduce the display of data and also keep it from having to jump around once you are done.

Choose Stop Monitoring so you can end the current session; then choose Start Monitoring and execute any action you would like to monitor. When all is set, choose Stop Monitoring once more. You are now able to search through the data you collected, with the use of the key table to filter by process and choose column headings to sort the data and locate the very process and files that were involved with the activity you have just executed.

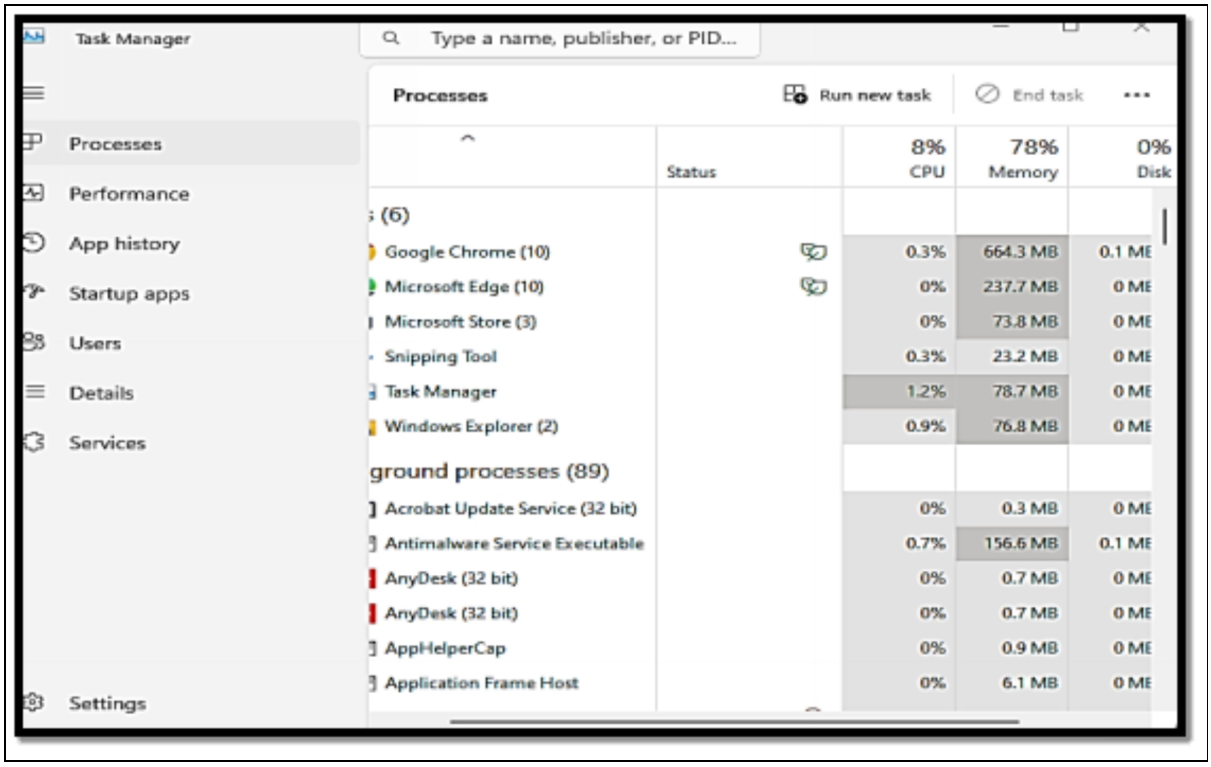
## Task Manager

When there is a need for you to analyze system performance, Task Manager’s performance page is almost without peers. It offers you a swift overview of the performance of your system in real-time,

measured in various dimensions. The details and charts displayed on the Performance page provide a continuously updated snapshot of CPU, GPU, memory, disk, and network usage, while the Processes page shows details about resource usage on a peer-process basis. Together, both displays can help you find out why your system is performing more slowly than it ought to in real-time.

**If you would like to open Task Manager, make use of any of the options below;**

- Tap **Ctrl + Shift + Esc**.




- Right-click **Start (or tap Windows key + X) and then choose Task Manager on the Quick Link menu.**
- Touch **Ctrl + A + Delete and then choose Task Manager.**

Note however that in a powerful Windows workstation, each disk, network, connection, and GPU has its own page, complete with a thumbnail graph; this configuration enables you to keep an eye on the speed of the disks on both internal and external drives. It can

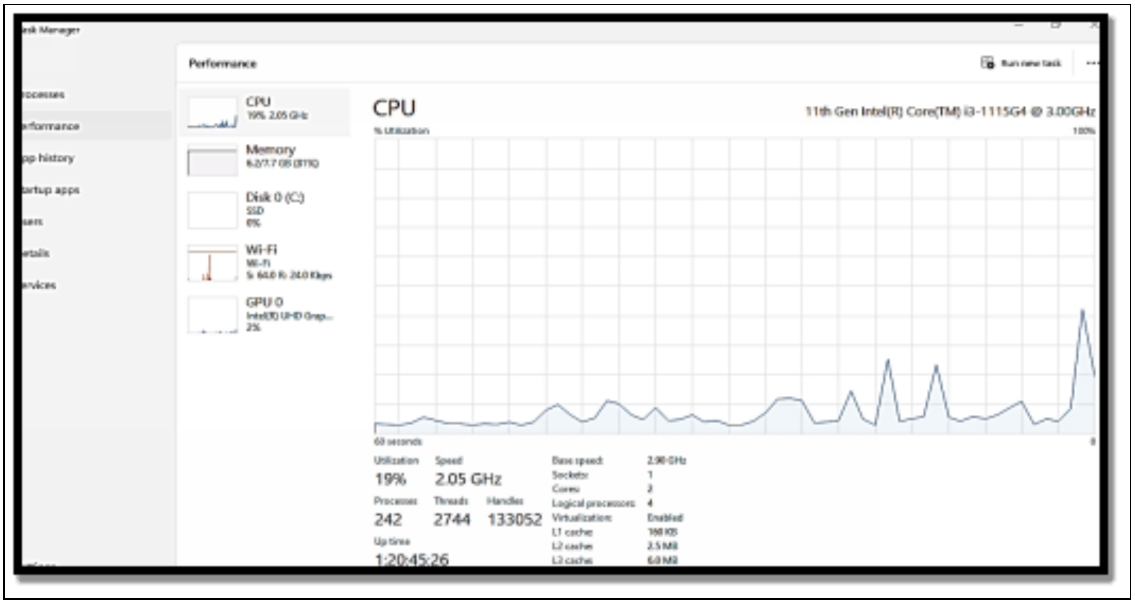
also help you to distinguish the performance of a discrete GPU from that of an integrated graphics processor. The small thumbnail graphs at the left report current data in real-time; choosing any of these thumbnails shows a more detailed page to its right, with a bigger version of the exact same graph and more information underneath the graph. Each of the graphs displays 60 seconds worth of data, with updates at one-second intervals. For example, the CPU graph can display a large spike caused by the opening of a graphics-intensive application, followed by various sammler spikes as other activities are also making their own demand on the CPU.

**If that once-per-second sampling rate does not offer the needed information, you are at liberty to change it.**

- Choose the **Settings icons** in the lower-left corner of the **Task Manager** and alter the value beneath the **Real-Time Update Speed setting from its default**, Normal, to High (updates every half-second) or Low (every four seconds). You can close choose Paused if there is a need for you to check out the most recent data without needing to scroll off the graph to the left.

**Below are some more tweaks you can make to Task Manager when you are looking at the Performance page;**

- Click **twice on any thumbnail** or you can also choose to r**ight-click a thumbnail and select Summary View** to conceal the full page and simply display the pane of thumbnails. To go back to the normal view, click twice on any thumbnail once more, or make use of the right-click menu to clear the check box close to the Summary View.




- From the very same right-click menu, choose **Hide Graphs** to display a data-only summary; right-click and select **Show Graphs** to bring back the performance thumbnails.
- Click **twice on the large graph** on the current page to show it in the **Graph Summary View**, which makes use of the total Task Manager window while concealing the chart and additional data of the thumbnail. Click **twice on the graph** once more to go back to the normal display of performance data.
- Choose the **See More** menu which is the three dots in the upper right corner and then choose Copy in order to make a summary of data from the current page that is being used on the Windows Clipboard.

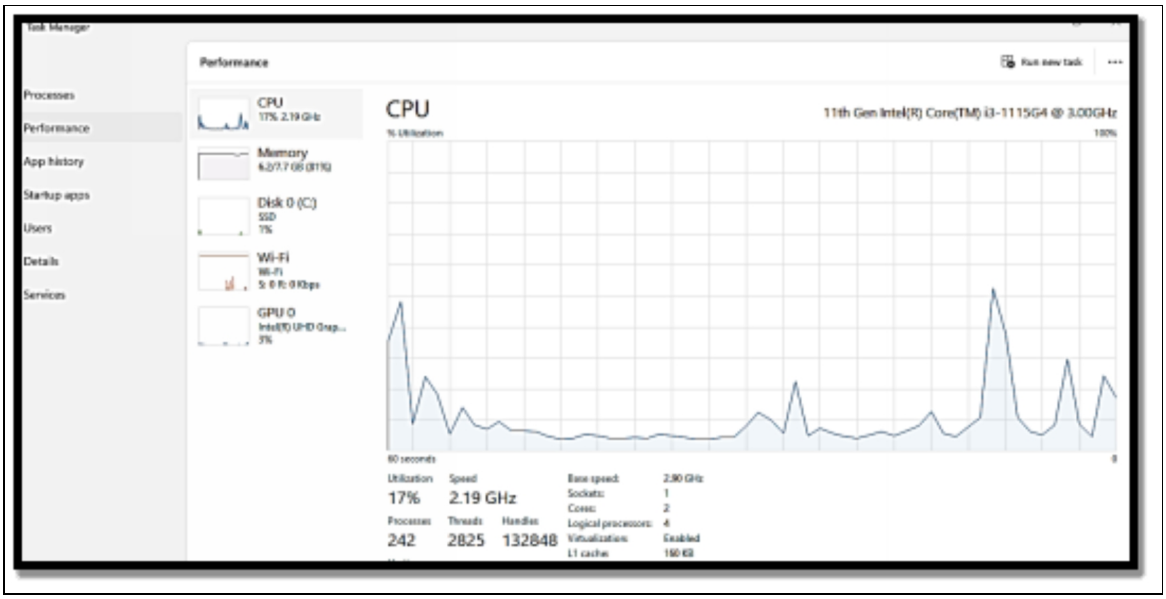
The Processes page's default view categorizes all operating processes into three types: Apps, Background Processes, and Windows Processes. Every process has its own entry in this default view; other apps consolidate numerous processes under a single entry that can be extended or collapsed. You can view resource use for that process or group of processes to the right of each item, with data arranged by default into four columns: CPU, Memory, Disk, and Network. Color coding emphasizes values in that column that use a larger-than-average share of the resource.

## Using Windows Performance Monitor

As a user, you must regularly monitor your computer's performance. The Windows 11 Performance Monitor is a sophisticated tool that allows users to evaluate their system's performance. It is a necessary tool for troubleshooting and enhancing system performance. The Windows 11 Performance Monitor is a built-in tool that checks the performance of your system which includes the CPU, memory, and disk usage, and also the network activity. It offers real-time data which enables users to keep track of the performance of their system and swiftly identify any issues.

**Follow the steps below to gain access to the Performance Monitor;**

- Tap the **Windows key + X** on your keyboard so as to open the Quick Link menu.
- Choose **Task Manager** > **Performance Monitor** from the list.



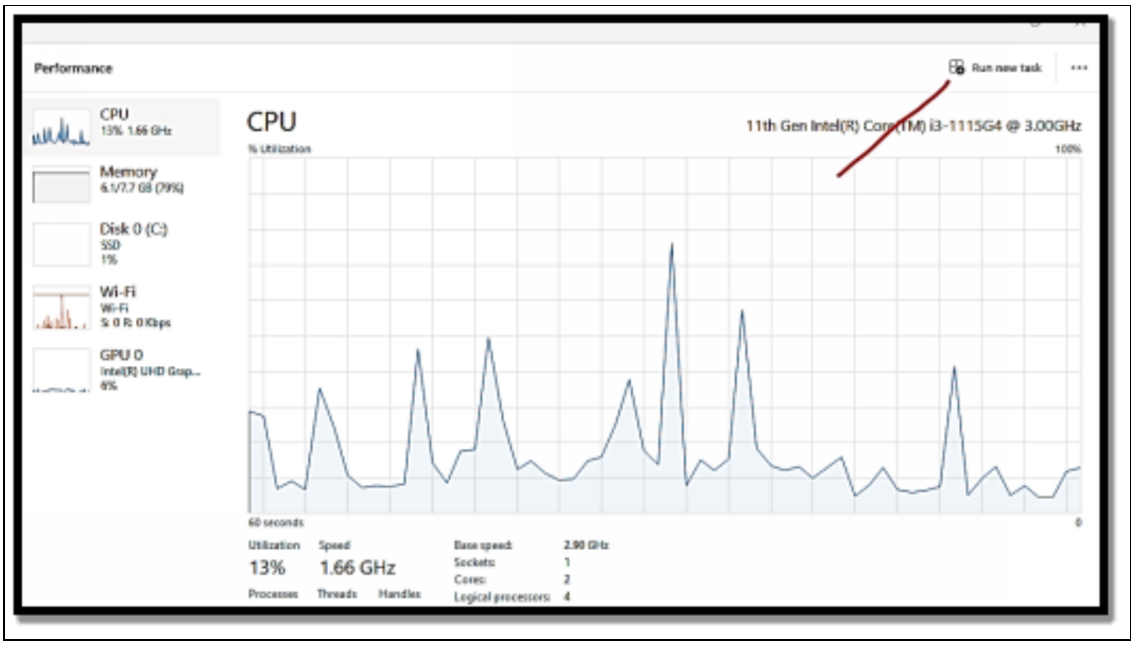

As an alternative, you can choose to access Performance Monitor by typing Performance Monitor in the search bar on the taskbar.

## How to monitor CPU usage using Windows 11 Performance Monitor?

CPU usage can be described as the percentage of the capacity being used. It is a very important performance indicator that can help with the identification of related issues to the speed and efficiency of your computer.

**Follow the steps below to check the CPU usage with the use of Windows 11 Performance Monitor;**

- Open the **Performance Monitor.**

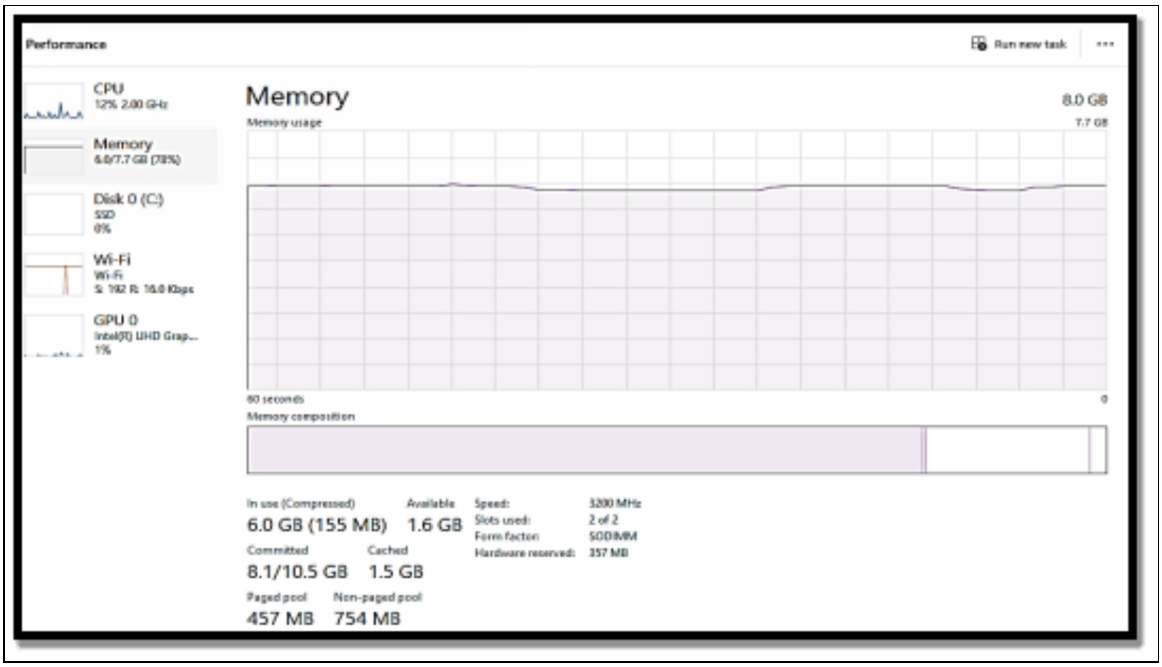



- Select Processor and then choose **CPU Usage**.
- Choose **Add** and then tap **OK** in order to commence monitoring CPU usage.

## Monitoring Memory usage with Windows 11 Performance Monitor

Memory usage can be described as the amount of RAM that is being used by your system. High memory usage can cause the system performance to be quite slow and might even **lead to its crash. If you would like to keep an eye on the usage of the use of Windows 11 Performance Monitor, follow the steps below;**

- Open the **Performance Monitor.**
- Choose **Memory** and then choose **Available Mbytes**.




- Select **Add** and then choose **OK** to commence the monitoring of memory usage.

## Monitoring disk usage with Windows 11 Performance Monitor

Disk usage is the total amount of disk activity that is ongoing on your system. High disk usage can lead to the performance of your system being slow and also make your computer work slowly.

**If you would like to monitor disk usage, follow the steps below;**

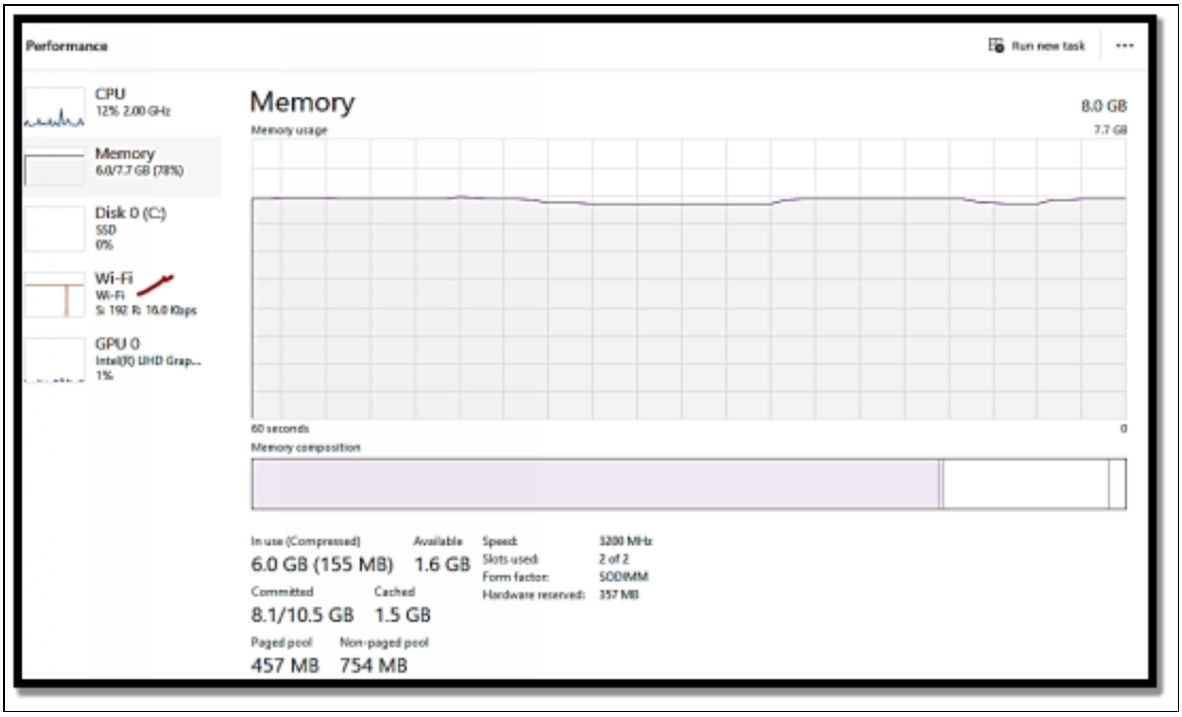
- Open the **Performance Monitor.**
- Choose **Physical Disk**
- Select **Add** and then choose **OK** to commence monitoring disk usage.

## How to monitor network activity with the Windows 11 Performance monitor?

The volume of data sent and received through your network is measured as network activity. Monitoring network activity is critical to ensuring that your network is working properly.

**Follow these steps to monitor network traffic using Windows 11 Performance Monitor:**

- Open the **Performance Monitor.**
- Choose **Wi-Fi**




- Select **Add** and then choose **OK** to commence monitoring network activity.

Performance Monitor is an excellent application for monitoring and diagnosing performance issues on your computer. The techniques outlined above are straightforward, and they can assist you in swiftly and efficiently monitoring the operation of your system. Regular monitoring and diagnostics can help you maximize the performance of your system, allowing you to work faster and more productively.

# Diagnosing Performance Bottlenecks

Identifying the root of a bottleneck isn't always easy because it could be caused by a variety of factors; nevertheless, by monitoring task manager data, we can usually narrow down which component, whether storage-related or otherwise, is causing the most troublesome periods in terms of performance. If disk usage appears

high during gaming sessions, chances are something is wrong somewhere within our storage setup; similarly, if while using software-intensive applications, CPU utilization maxes out but no visible result occupies our screen(s), this indicates there very well may be throttling happening in our background tasks, resulting in abnormal gaming session behavior...in short: Determine where the most load is concentrated among active processes and conduct appropriate investigations. A PC bottleneck occurs when your primary components (CPU, RAM, and video card) cannot operate together rapidly enough to meet your computer's demands. When using programs or playing games, this can create lag or slowdowns. It's similar to a motorway traffic jam: if one automobile goes too slowly, it might produce a backup that affects other cars as well. In the context of computers, this means that one component is preventing all other components from performing at their maximum capability.

When you encounter a PC bottleneck, it indicates that either your CPU or GPU is insufficiently powerful to meet the demands of what you're attempting to achieve. This could result in lower frame rates in games and overall choppy performance. It may also cause audio and video stuttering while streaming web content or watching videos. A PC bottleneck is most commonly caused by an outdated or underpowered processor (CPU), graphics card (GPU), or random-access memory (RAM). A lack of overall RAM can potentially lead to bottlenecks if your computer requires more resources than you have available. Furthermore, running software that is overly demanding for your system will result in bottlenecks. For example, if you run a high-end game on an older or less powerful laptop, it may choke even though all of its components are current and strong enough for everyday work. To eliminate potential PC bottlenecks, ensure that all of your system's components are compatible and up to date. You should also monitor and tune your system to ensure that it performs optimally; this includes tracking your usage patterns, ensuring that all necessary drivers are up to date, and ensuring that there are no malware/viruses present on your system that may divert resources away from processes that require them. Also, be cautious with the

applications you download and install. Before installing anything, always verify the minimal requirements! Finally, upgrade any outdated hardware to provide more processing power for modern apps and games. Bottlenecks are less likely to develop when processing power is increased. Note however that overclocking allows users to increase their CPU's operating frequency rate beyond what it was originally rated for, resulting in greater performance levels and, as a result, fewer bottlenecks caused by now-enabled components. When attempting to overclock, however, the chance of hardware failure grows significantly. Furthermore, the amount of increase obtained through overclocking is typically quite small (in comparison to other solutions like adding additional components) and is sometimes overshadowed by other variables such as poor cooling methods or insufficient system resources, resulting in instability concerns!

To troubleshoot a bottleneck, you must first determine the source of the bottleneck before attempting any type of fix. This can include a variety of diagnostic operations such as monitoring task management reports, benchmarking apps, and tracking usage trends during active sessions. With this information, users should evaluate which component(s) is/are causing their systems to slow down and investigate possible solutions. Updating drivers, upgrading older hardware configurations (CPU, GPU, and RAM), eliminating superfluous background jobs using Windows task manager, and optimizing how the system functions overall by making small tweaks/changes are common methods.

# Activity

1. Monitor your device with the use of the Performance Monitor.
2. What are performance bottlenecks?

# CHAPTER 29
# GAMING AND GRAPHICS OPTIMIZATION

Microsoft has made numerous claims about Windows 11 being the finest operating system for gaming. The company did provide some new capabilities, such as direct storage and auto HDR, but Windows 11 is mostly identical to Windows 10. Direct storage is a technical capability that allows your computer to skip the processor while loading data from an NVMe solid-state drive to the graphics card. It reduces the amount of processor power used by games when loading textures, resulting in speedier loading times. However, software developers must include direct storage in their games, and no titles had this functionality when Windows 11 was released.

Auto HDR in Windows 11 will provide gamers with improved graphics. Auto HDR is a system that automatically improves the visuals of a game's content without the need for user intervention. Windows 11 will recognize an HDR-enabled monitor and improve the color of games written with DirectX 11 or above with dynamic range enhancements. For the greatest visual gaming experience, Auto HDR is the way to go! The settings app in Windows 11 features a separate gaming tab where you may switch to 'Game Mode'. This will limit background program consumption automatically, freeing up the CPU for gameplay. In accordance with the Windows 11 launch statement, there is a need for a CPU that is 1GHz or faster with 2 or more cores on a compatible 64-bit processor or System on a Chip (SoC). In definite terms, this means the following CPU will be compatible;

- Intel Core 8th generation (Coffee Lake, Whiskey Lake) and later.
- AMD Zen+ (Ryzen 2000, Threadripper 2000, Ryzen 3000G APU) and later

However, this is not an exhaustive list and older CPUs may be compatible with Windows 11 - however, the age of other components in your system(s) may be a guiding factor, and subject to change. Please check the Windows 11 compatibility in any scenario. Another essential consideration is whether your DRAM requirements will be compatible with your CPU today and in the future. The system must have at least 4GB (Gigabytes) of DRAM to run Windows 11. However, as previously said, having more than the bare minimum requirements will ensure a better gaming experience.

## DirectX 12 Ultimate Features

DirectX has been around for a while and helps developers design games that make the most of your gaming PC's components. The initial version of DirectX was released in 1995, and it has seen multiple modifications since then, with each iteration allowing PC players to fully experience a wide range of amazing PC games. But what exactly does DirectX do, and what makes DirectX 12 Ultimate so special? Microsoft DirectX is a set of application programming interfaces (APIs) that enable games to "talk" to various components in your gaming machine, such as your graphics card, RAM, and so on. It was designed to make it easier for games to access these critical components while simultaneously protecting your machine's security and integrity.

DirectX is useful for a multitude of reasons, not the least of which is that it functions as a bridge to gaming PCs all over the world, which naturally contain a range of different components. After all, each gaming PC is unique, and certainly not as ubiquitous internally as, say, the Xbox Series X machine. DirectX soon became a key component of Windows gaming. Doom was the first game to use DirectX. Doom previously operated on MS-DOS and had to be ported to function with Windows. The initiative to adapt Doom into DirectX was overseen by Valve's President Gabe Newell (who was then working for Microsoft), and this is how the future of PC gaming began.

**Since then, DirectX has been through various iterations with upgrades to help it improve how it works;**

- DirectX9 was released in 2002 and worked with Windows 98 and Windows XP. It brought in Shader Model 2.0 and also brought Pixel Shader 2.0.
- DirectX10 was a very important upgrade to DirectX that was just available in the Windows Vista although it was regarded as quite a significant upgrade.
- Directx 11 was launched in 2008 and came with improved support for multi-threading so that developers can make the most of multi-core CPUs. A version of it was also utilized on the Xbox One.
- DirectX 12 was launched in 2015 with Windows 2015. The most important update was the enabling for more efficient resource utilization which has a goal to get console-level efficiency on phone, tablet, and PC. It also worked so well with multi-GPU systems which included AMD CrossFireX or Nvidia SLI setups.
- DirectX Raytracing (DXR) was included in Windows 10 in 2018 in the year 2018 and it also brought in real-time ray tracing.
- DirectX 12 Ultimate was released in 2020 and is without a doubt the most important upgrade yet.

DirectX 12 Ultimate is a big improvement for the system and the future of PC gaming. It included new features such as DirectX Raytracing, Variable Rate Shading, Sampler Feedback, and others.

# Variable Rate Shading

VRA on its own is quite interesting and also offers game developers more control over the level of details in terms of shading and things like Mesh Shaders. What this also means is simply that your graphics card can be used in a more efficient manner and get to do things like prioritizing the rendering of things that are in focus first. This works via assessing each color, brightness, contrast, and more of the pixel and also focusing on shading the most important parts of those visuals first before any other thing. Hence the important parts

are seen at complete resolution while others have lower priority and make use of less GPU processing power. This will ultimately improve the rates of the frame as well as your overall gaming experience.

## DirectX Raytracing (DXR)

It's possible that you are already aware of ray tracing. Nvidia has been pushing ray tracing for a while now with the use of its RTX line-up of graphics cards. With the use of DirectX Raytracing, games are able to simulate just how lighting works in real-time, but in the game world instead. DXR basically works out just how light ought to bounce and reflect in the environment, bouncing off your surroundings and also the gaming environment as a whole. The fact that DirectX 12 Ultimate has unified code with the Xbox Series X is maybe the most significant aspect of it. This means that games designed for consoles will now work more simply on PCs as well. All of this implies that gamers on both Xbox and PC should expect more immersive games. Expect higher-quality graphics, improved in-game lighting, and other improvements. Of course, this assumes you have the necessary hardware. Some of the features in DirectX 12 Ultimate are dependent on developers to implement them, so it may be some time before we see the rewards of their labors, but there should be even better-looking PC games to look forward to in the future.

To make the very most of DirectX12 Ultimate, there is a need for you to possess the recent hardware. The good news about this is that Nvidia’s GeForce RTX 30 Series and the GeForce RTX 20 Series GPUs offer support for DirectX 12 Ultimate. AMD’s Radeon RX 6800 Series and RX6900 XT graphics cards also offer support for the new version as well.

**To be sure your system works with DirectX12 Ultimate, follow the steps below.**

## Check with the Xbox Game Bar

**You can easily check for DirectX12 Ultimate support by making use of the Xbox Game Bar;**

- Tap the **Windows key + G**.
- Choose **the settings cog (located at the top right).**
- Choose **gaming features**.
- Once the above has been completed this page should then show if your system is compatible or not.

**You can also choose to check with the use of the DirectX Diagnostic tool;**

- Tap the **Start button and type "dxdiag"**.
- Choose t**he dxdiag run command.**
- Ensure you wait a little for the tool to execute.
- Check the results being displayed.
- Choose **Display 1 and look for DirectX12 Ultimate there.**

# NVIDIA DLSS and AMD Fidelity FX Super Resolution

# Nvidia DLSS

If you've recently purchased a new graphics card or played a recent AAA game, you've probably heard of DLSS. It's one of the most hyped features for Nvidia's RTX gaming GPUs, and it has the potential to be a game changer. However, the buzz around DLSS frequently obscures what it is, when it may be used, and if it is even worth enabling. Deep Learning Super Sampling (DLSS) is simply an AI-powered image-enhancement technology available only on Nvidia's RTX graphics cards. It is, in fact, one of the earliest examples of AI technology that has shown to be both practical and widely used. The concept is straightforward: leverage the AI hardware built into Nvidia GPUs to improve game performance and framerate. There are three different types of DLSS, which can be perplexing. The initial incarnation of DLSS was introduced in 2019 (as part of a Battlefield V update), however, it has been completely superseded by DLSS 2, which was released in 2020 and featured significantly improved graphic quality, transforming DLSS from a kind of worthless function to something you'd want to enable. In 2022, DLSS 3 was released, which included AI-generated frames (or frame

generation). Essentially, DLSS 1/2 uses AI to boost resolution, while DLSS 3 uses AI to increase resolution while also creating new frames. To different degrees, all RTX-branded Nvidia cards support DLSS. Even while all RTX GPUs feature AI hardware, only RTX 40 GPUs, such as the RTX 4090, enable DLSS 3's frame generation technique at the time of writing. Furthermore, DLSS is only available in a few titles, like Cyberpunk 2077 and Hitman World of Assassination. Today, slightly more than 300 games support at least one version of DLSS, with 36 of those titles supporting both DLSS 1/2 and 3.

Considering DLSS is such a sophisticated and cutting-edge technology, here's a quick rundown of how it works. All RTX GPUs contain standard rasterization cores for rendering the game, as well as Tensor cores for AI acceleration. The idea is that those Tensor cores can improve the image quality of the frames created by the rasterization cores or possibly create entirely new frames. However, because game art direction and graphics vary greatly, game-specific AI training is required to achieve the greatest image quality. For example, an AI taught in Minecraft would be unsuitable for usage in The Witcher 3. A performance-enhancing setting is DLSS 1/2 (which just employs resolution upscaling). For example, if you set your resolution to 1080p and enable DLSS, the GPU isn't rendering the game at 1080p and then adding Tensor cores to make it look like 1440p. Instead, it's rendering the game at 720p (or a similar low quality) and using DLSS to make it look like 1080p. The ultimate outcome is for the game to appear the same but to run at a substantially higher framerate. DLSS 3 is similar to DLSS 2 but adds a frame creation stage. After rendering and upscaling two frames, the Tensor cores will look at the difference between those two frames and guess what happened in between, as shown in the image above. In comparison to DLSS 1/2, DLSS 3 can increase framerate by roughly 50%.

## AMD Fidelity FX Super Resolution

FidelityFX Super Resolution (FSR) from AMD is a supersampling function that is accessible in a wide range of games. Its purpose is

straightforward: to improve gaming performance on the greatest graphics cards. It works by rendering your game at a smaller resolution, but FSR's magic is in the upscaling. It attempts to fill in missing elements to make your game appear to be running at native resolution but with a large performance improvement. Here's everything you need to know about it. AMD's response to Nvidia's Deep Learning Super Sampling (DLSS) is FSR. FSR, like DLSS, is a supersampling function that makes a game appear to be rendering at a greater resolution than it actually is. As an example, the engine may render the game at 1080p, and then FSR steps in to fill in the empty pixels to produce a 1440p output. FSR currently has two versions, and FSR 2.0 is far superior to the original. There are various distinctions between them, which we will discuss in the following part. Although some games still use the original FSR, more and more titles are using FSR 2. There is one significant difference between both versions of FSR and DLSS. DLSS requires an Nvidia RTX GPU, whereas FSR works with AMD, Nvidia, and even Intel graphics cards. Official support is limited to the GTX 10-series and Radeon RX 400 series, while FSR can run on earlier systems.

FSR 1.0 and 2.0 operate in very different ways, although they have a common core. The Lanczos technique is used for upscaling in both supersampling features. It begins by delivering a low-resolution image to the upscale, which is then blown up with added detail based on the algorithm. After that, FSR does a sharpening step to restore a little more detail. At a high level, this is how it works, but the crucial difference between FSR 1.0 and FSR 2.0 is anti-aliasing. With FSR 1.0, the game would run anti-aliasing before applying upscaling, resulting in significantly lower image quality when the game had a weak anti-aliasing implementation. FSR 3 is a new suite addition that includes Fluid Motion Frames. It analyzes two successive frames to generate a new one between them, akin to Nvidia's DLSS 3. AMD claims that frame interpolation can double or even triple your frame rate in supported games. Immortals of Aveum and Forspoken will be the first games to feature FSR 3, with a post-launch update. However, AMD claims that numerous additional games are in the pipeline, including Cyberpunk 2077, Crimson

Desert, and Frostpunk 2. FSR 3 works on any GPU, the same as the original FSR. Furthermore, AMD is making its Fluid Motion Frames technology available through its AMD Software, allowing you to use it in almost any game that uses an AMD GPU.

## Advanced Graphics Settings for Gamers

Anyone who uses a PC knows how important a decent graphics card is because it handles the majority of the display work. As a result, they are constantly looking for ways to increase their video and visual performance by adjusting various parameters. One of these is advanced graphics, which takes advantage of Hyper-V virtualization technologies. Although Windows 11 is a strong operating system, it does not include the most powerful graphics hardware. The graphics card is the primary component of your computer that allows images to be displayed on the monitor. This is especially important if your computer has a low resolution and you want to have the finest possible experience. If you experience latency and stuttering when playing games, boosting enhanced graphics on your Windows 11 PC may help.

**Follow the steps below to elevate the performance of your GPU;**

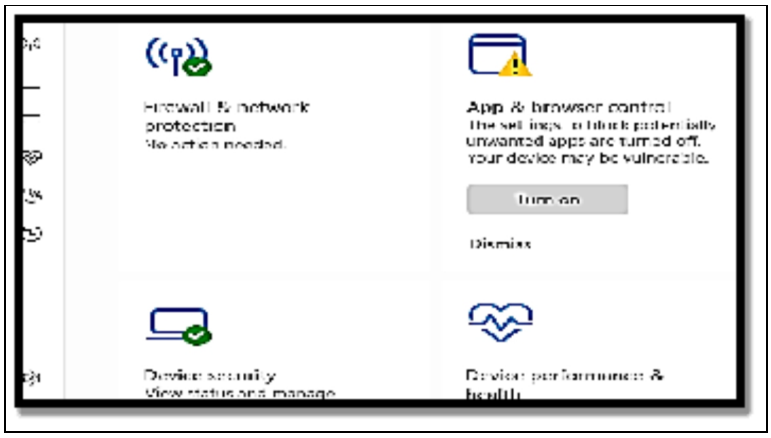
- **Upgrade your RAM memory**: RAM is a very important component to the performance of your computer. This is very important due to the fact that when you happen to be running a game or an application, the more memory you have, the faster you will be able to access such data.
- **Upgrade drivers**: The upgrading of your graphics card driver ought to be done frequently. With this, you will be sure that your system will continue to get the latest updates from the manufacturer and remove any issues you might have with compatibility.
- **Change the display resolution**: A much higher resolution will help you enjoy better visual quality when you are playing games or watching videos on your computer.
- **Install a third-party graphic card driver**: The integrated GPU has been manufactured as a low-cost choice for users who do

not like to spend so much money on a particular card. You may take note that there are times when Windows 11 is not making use of the GPU, or your games run slowly or even crash sometimes if you are making use of this card.

- **Power Settings:** The power settings of your system will also affect GPU performance. There might be a need for you to tweak your power settings in order for you to get a balance of both efficiency and power.

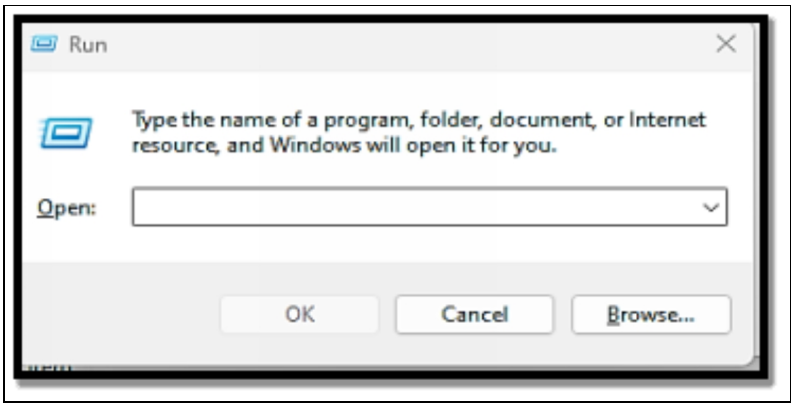
## Enabling advanced graphics in Windows 11?

- **Make use of Windows Security.**
    - Tap the **Windows ke**y, type Windows Security in the search bar, and then choose **Open.**
    - Tap **App & Browser control,**




        - Then choose **Change Applications Guard settings beneath isolated browsing.**

    - Find the Advanced Graphics section and **switch it on.**
    - Windows will then restart, and this setting will then be activated.
- Use the Registry Editor
    - Touch **the Windows + R keys** in order to open the Run command.




- Type **regedit** in the dialog box to open the Registry Editor.
- Locate the following location; Computer\HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Hvsi
- Click **twice on Enable Virtual GPU**, then configure 1 as the Value data and tap the **OK button.**

# Activity

1. What are DirectX 12 Ultimate features?
2. NVIDIA DLSS and AMD Fidelity FX Super Resolution.

# CHAPTER 30
# ADVANCED NETWORKING AND REMOTE DESKTOP

Your ability to interact, share, and work with your colleagues via gadgets of various shapes and sizes defines modern computing. Most of that activity now takes place through the internet, the world's largest global network, and employs a range of generally agreed hardware and software standards. The internet is also fueling cloud-based services, which are changing the way we work and play. The same network standards that allow internet connections can also be used to set up a local area network (LAN), which allows you to share files, printers, and other resources in your home or workplace. Setting up a network connection used to be a laborious task that frequently necessitated the assistance of a professional. Network hardware is now widely available, and configuring a network connection in Microsoft Windows 11 takes little or no technical skills. That doesn't imply the procedure is painless; troubleshooting network difficulties may be frustrating, and understanding the fundamentals of networking is extremely important in isolating and resolving issues.

In this chapter, you will learn about advanced networking and remote desktop protocol and also how you can make use of these features in Windows 11.

## Configuring Network Policies

A network policy is a set of rules and parameters that regulate how network connections are managed and secured on a computer or in a network environment in Windows. To guarantee that network resources are used securely and efficiently, network policies establish access controls, authentication mechanisms, and other configuration elements. These policies aid in the preservation of network resources' integrity, confidentiality, and availability. A network policy is a set of rules and parameters that regulate how

network connections are managed and secured on a computer or in a network environment in Windows. To guarantee that network resources are used securely and efficiently, network policies establish access controls, authentication mechanisms, and other configuration elements. These policies aid in the preservation of network resources' integrity, confidentiality, and availability.

The Network Policy Server (NPS), a role service in Windows Server operating systems, is primarily used to create and enforce network policies in Windows. NPS provides a centralized platform for establishing and managing network policies, which is especially useful in enterprise settings. The Network Policy Server (NPS), a role service in Windows Server operating systems, is primarily used to create and enforce network policies in Windows. NPS provides a centralized platform for establishing and managing network policies, which is especially useful in enterprise settings. Network Policy Server (NPS) makes use of network policies and the dial-in properties of user accounts to determine if a connection request is authorized to connect to the network.

This procedure can be used in the configuration of a new policy in either the NPS console or the Remote Access console. When NPS authorizes a connection request, it compares it to each network policy in the ordered list of policies, beginning with the first policy and working along the list of set policies. If NPS discovers a policy whose conditions match the connection request, NPS performs authorization using the matching policy and the user account's dial-in characteristics. If the user account's dial-in parameters are configured to grant or control access via network policy and the connection request is authorized, NPS applies the network policy settings to the connection. If NPS cannot discover a network policy that matches the connection request, the connection request is refused unless the user account's dial-in attributes are set to grant access. If the user account's dial-in attributes are set to deny access, NPS rejects the connection attempt.

**When you use the New Network Policy wizard to establish a network policy, the value you specify in the Network connection**

**method is utilized to automatically configure the Policy Type condition:**

- If you use the default value of Unspecified, NPS will analyze the network policy you write for all network connection types that use any sort of network access server (NAS).
- When you provide a network connection method, NPS only checks the network policy if the connection request comes from the network access server that you specify.

If you want the policy to allow users to connect to your network, you must select Access granted on the Access Permission page. Select Access denied if you want the policy to prevent users from connecting to your network. Select the Access is decided by the User Dial-in Properties check box in Active Directory® Domain Services (AD DS) if you want access authorization to be determined by user account dial-in properties.

**If you would like to add a network policy, follow the steps below;**

- Open the **NPS console**, and then click **twice on Policies**.
- In the console tree, right-click **Network Policies**, and choose **New**. The New Network Policy wizard will then open.
- Make use of the New Network Policy wizard to create a policy.

## Creating Network Policies for Dial-Up or VPN with a Wizard

You can make use of this method to design the connection request policies and network policies needed to deploy either dial-up servers or virtual private network (VPN) servers as Remote Authentication Dial-In User Service (RADIUS) clients to the NPS RADIUS server.

**Once you execute the Wizard, the policies below are created;**

- One connection request policy.
- One network policy.

You can proceed to execute the New Dial-up or Virtual Private Network Connections wizard each time you have a need to design new policies for dial-up servers and VPN servers. Executing the New Dial-Up or Virtual Private Network Connections wizard is not the only step needed for the deployment of dial-up or even VPN servers as RADIUS clients to the NPS. The two network access procedures need additional hardware and software components to be deployed.

**Follow the steps below for the creation of policies for dial-up or VPN with the use of a wizard;**

- Open the **NPS console**. If this has not been chosen yet, choose **NPS (Local)**. If you would like to create policies on a remote NPS, choose **the server.**
- In Getting Started and Standard Configuration, choos**e RADIUS server for Dial-Up or VPN connections**. The text and the links beneath the text will be altered so as to show your selection.
- Choose **Configure VPN or Dial-Up with a wizard**. The New Dial-Up or Virtual Private Network Connections wizard will then open.
- Follow the various prompts in the wizard to complete the creation of your new policies.

## Create Network Policies for 802.1X Wired or Wireless with a Wizard

This technique can be used to construct the connection request policy and network policy needed to deploy 802.1X authenticating switches or 802.1X wireless access points as Remote Authentication Dial-In User Service (RADIUS) clients to the NPS RADIUS server. This technique describes how to launch NPS's New IEEE 802.1X Secure Wired and Wireless Connections wizard.

**After you execute the wizard, the policies below will then be created;**

- One connection request policy
- One network policy.

You can use the New IEEE 802.1X Secure Wired and Wireless Connections wizard to set new policies for 802.1X access whenever you need to. The New IEEE 802.1X Secure Wired and Wireless Connections wizard is merely one step in the process of deploying 802.1X authenticating switches and wireless access points as RADIUS clients to the NPS. Both network access techniques necessitate the installation of additional hardware and software.

**If you would like to create policies for 802.1X wired or wireless with a wizard, follow the steps below;**

- Locate the NPS, in the server manager, choose **Tools**, and then choose **Network Policy Server.** This will open up the NPS console.
- Choose **NPS (Local)** if this has not been chosen earlier. If you would like to create policies on a remote NPS, choose the server.
- In Getting Started and Standard Configuration, choose **RADIUS server for 802.1X Wireless or Wired Connections**. The text and links beneath the text will be altered to show your selection.
- Choose **Configure 802.1X** with the use of a wizard. The New IEE 802.1X secure wired and wireless connections wizard will then open.
- Follow the prompts in the wizard in order to complete the creation of your new policies.

# Configure a Network Policy for VLANs

This technique can be used to set up a network policy that assigns users to a VLAN. You can create a network policy to direct access servers to assign members of specified Active Directory groups on specific VLANs when you utilize VLAN-aware network hardware such as routers, switches, and access controllers. VLANs' ability to logically group network resources enables flexibility when planning and executing network solutions. When configuring an NPS network policy for use with VLANs, you must configure the Tunnel-Medium-Type, Tunnel-Pvt-Group-ID, Tunnel-Type, and Tunnel-Tag characteristics.

**Follow the steps below to configure a network policy for VLANs;**

- **On the NPS;** in the Server Manager, choose **Tools**, and then select **Network Policy Server**. The NPS console will then be opened.
- Click **twice on Policies**, choose **Network Policies**, and then in the pane containing details click **twice on the policy** that you would like to configure.
- In the Policy Properties dialog box, choose the **Settings tab.**
- In policy Properties, in Settings, and In RADIUS Attributes, make sure that Standard is chosen.
- The Service-Type attribute in the details pane is set to Framed by default in Attributes. The Framed-Protocol attribute is set to PPP by default for policies with VPN and dial-up access methods. Click **Add to define additional connection attributes required for VLANs**. The dialog box Add Standard RADIUS Attribute appears.
- In Add Standard RADIUS Attribute, in Attributes, scroll down to the tail end and include the following attributes;
    - **Tunnel- Medium-Type**: Choose a value appropriate to the former selections you have made for the policy. For instance, if the network policy you are about to configure is a wireless policy, choose Value: 802(this will include all 802 media and also Ethernet canonical format).
    - **Tunnel-Pvt-Group-ID**: Insert the integer that shows the VLAN number to the very group each group member will be assigned.
    - Tunnel-Type: Choose Virtual LANs (VLAN).
- In Add Standard RADIUS Attribute, choose **Close.**
- If your network access server (NAS) requires the Tunnel-Tag attribute, follow the **procedures below to add it to the network policy. Do not include this attribute in the policy if your NAS documentation does not mention it. If necessary, add the following attributes:**
    - In policy Properties, in Settings, in RADIUS Attributes, choose Vendor Specific.

- In the pane containing details, choose **Add**. The Add Vendor Specific Attribute dialog box will then open up.
- In Attributes, move down to and choose Tunnel-Tag, and then choose **Add**. The Attribute Information dialog box will then be opened.
- In Attribute value, insert the value you got from your hardware documentation.

## Remote Desktop Protocol (RDP) Security

Microsoft's Remote Desktop Protocol (RDP) is a secure network communication protocol. It enables users to do remote operations on other computers and enables secure data transmission between remotely connected workstations over an encrypted communication channel. RDP is critical in today's system administration because it provides businesses and individuals with remote access capabilities, enabling collaboration and effective asset management. RDP is the technology that allows you to connect to a remote desktop. RDP's primary design goal is to provide a Graphical User Interface (GUI) for an organization to remotely operate another PC. Clients can access data, run applications, and run tasks as if they were physically present at the remote machine. RDP connects a local computer running the RDP client to a remote device hosting the RDP server using a client-server model. The convention ensures secure information transmission and display delivery, allowing clients to seamlessly connect with the remote framework.

Consider an RC car to understand how RDP works. When the user clicks a button on the remote, the car moves in response. Similarly, RDP allows you to not only login but also perform desktop tasks remotely. RDP is really simple to use. It establishes a dedicated connection for transmitting data back and forth between the computers, one remotely linked and the other currently in use. It always uses network port 3389 for this purpose.

TCP/IP, the transport protocol for most Internet traffic, transports mouse clicks, keystrokes, the desktop display, and all other essential data via this channel. Furthermore, RDP encrypts all data to improve the security of public Internet connections. Since each mouse click

and input must be encrypted and delivered to the remotely connected computer, it may take a few seconds to reflect, but it will be displayed soon.

## Advantages of RDP in networking

**RDP has a lot of advantages in networking which range from remote access to secure data transfer and a lot more. Some of the advantages are highlighted below;**

- **Remote control and access:** RDP allows clients to gain access to their PCs or servers from any place, working with remote work and also expanding efficiency.
- **Cost savings and utilization of resources:** RDP allows the sharing of processing assets, reducing the requirement for individual workstations and also reducing equipment and upkeep expenses.
- **Administration and management are centralized:** Maintenance tasks are made a whole lot simpler by the ability of IT administrators to effectively manage and update the software on various remote systems from a very centralized location.
- **Improved security and encryption:** RDP makes use of very solid conventions, guaranteeing a very secure information transmission and reducing the gamble of access that happens to be unapproved.

## Use Cases for RDP

**There are various scenarios where RDP comes in very handy;**

- **Remote work and working from home**: RDP empowers representatives to telecommute in other far places, safely getting to their office PCs.
- **IT backing and investigating**: IT professionals can remotely diagnose and fix users' computers, bringing a reduction in downtime and increasing support efficiency.
- **Virtual Desktop Infrastructure:** RD is quite important to VDI solutions since it allows various users to gain access to virtual

desktops that are hosted on just one server.

- **Using Remote Server Application**: With the use of RDP, users are able to make use of applications that are hosted on a remote server with high performance and low latency.

RDP is quite a vital systems administration innovation that aids in empowering remote access and control of PCs and servers. Its adaptability and security highlights ensure it becomes a vital apparatus for remote work and support of IT and also a unified asset to the board. As organizations get to embrace remote workplaces, the importance of RDPs in system administration is meant to develop, driving further headways in far-off work area arrangements.

# Remote Desktop Service and Virtual Desktop Infrastructure (VDI)

## Remote Desktop Service

Microsoft Remote Desktop Service can be described as a set of components of the Windows operating system that serves a very important purpose. It brings together various features that allow users to gain access to graphical desktops and Windows applications remotely. The remote capabilities that much later became RDS were at first known as Terminal Services in Windows Server 2008 and older versions of the OS. As the product began to develop and then into RDS from the terminal server, more operation was built into the product. In most cases, the terms RDS and terminal server are often used in an interchangeable manner. RDS is majorly targeted at business users as evidenced by its inability to connect with machines that run Windows 7 Starter or Home, Windows 8 Home, Windows 8.1 Home, or Windows 10 Home editions. Even though it is a Microsoft-oriented remote access solution, remote desktop clients for macOS, Android, and iOS devices are made available at the Microsoft store.

## Uses of RDS

**Various organizations make use of RDS in two key ways in order to gain access to Windows desktops and applications in a remote manner and also to help meet business requirements;**

- The RemoteApp facility of RDS allows a business to create cloud-based applications available to users on personal computers as well as mobile devices. This allows application management to be more centralized and gives an assurance of consistency throughout an organization.
- The Microsoft Remote Desktop component of RDS enables users to connect to an alternative desktop freeman on their current device. Once a connection has been established, users can then interact with the remote desktop in accordance with the permissions they have on the system. Individuals can make use of this new virtual desktop as though it was installed on their own physical machine.

# Key benefits of RDS

**The benefits of RDS are well-tied to its business uses. Below are some of the benefits businesses can enjoy when they implement a remote desktop service environment;**

- Windows applications can be sent to devices that do not have the ability to execute them natively. This includes machines with resources that are inadequate and also those that run other operating systems such as iOS or Android.
- More computing resources can be given to centralized, cloud-based applications that are used in a remote manner for the provision of enhanced performance as against upgrading devices or all end-users.
- Data can be saved in the cloud, ensuring it is more secure in the event of the failure of a user device or the device being stolen.
- The time needed to configure new user devices is diminished by delivering applications and desktops from a master image in the cloud to a device that offers support to a remote desktop client.

All of the above-discussed benefits help to create a more streamlined method of managing and delivering applications to end users, saving the business money on administrative resources that are quite technical. Employee productivity is increased by the ability to remotely gain access to desktops and applications. As an organization's remote workforce increases, these benefits will then become even more valuable. **Follow the steps below to establish a remote desktop service;** It is worth noting however that while a Remote Desktop server (as in, the PC that you are connecting to) needs to be running a Pro edition of Windows, the machine of the client (the device you are connecting from) can be running any edition of Windows (Pro or Home), or even a different operating system entirely.

- **Configure the PC you would like to connect to so it enables remote connections;**
    - Ensure you have Windows 11 Pro. If you would like to check your version, choose **Start,** and open S**ettings**. Beneath System, choose **About**, and then under **Windows specifications, search for Edition**.
    - When you have confirmed and you are all ready to commence, choose **Start, and open Settings. Beneath System, choose Remote Desktop, configure Remote Desktop to On, and then choose Confirm.**
    - Be sure you do take note of the name of this PC under the PC name as this will be needed much later.
- **Use Remote Desktop to connect to the PC you would like to configure;**
    - On your local Windows PC: In the search box on the taskbar, type **Remote Desktop Connection, and then choose Remote Desktop Connection**. In Remote Desktop Connection, insert the name of the PC you would like to connect and then choose **Connect**.
    - On your Windows, Android, or iOS device: Open the **Remote Desktop app ( this is usually available for free from the Microsoft Store, Google Play, and also the Mac App Store)**, and then **add the name of the PC that you would like to connect to**. Choose **the remote**

**PC name** that you added, then wait a bit for the connection to be completed.

## Virtual Desktop Infrastructure

Virtual Desktop Infrastructure which usually is denoted as just VDI can be described as an IT infrastructure that enables you to gain access to enterprise computer systems from just any device like your personal computer, smartphone, ore ven your tablet, removing the need for your company to get you, manage, repair and also probably replace a physical machine. Authorized users can also gain access to the same company servers, files, applications, and services from any approved device via a secure desktop client or browser. With the help of VDI, users are able to execute traditional desktop workloads on servers that are centralized and this has become the standard in business configurations to offer support for remote and branch office workers and offer them unlimited access to contractors as well as partners. VDI aids the protection of company applications and data that are quite sensitive, enabling users to make use of their own devices without having to worry about getting personal data involved with corporate assets.

There are various ways to deliver virtual desktops and applications to users; virtual desktop infrastructure of course but there are also other flavors of VDI like desktop as a service (DaaS) and even personalized Cloud PCs. All of these services are now becoming quite popular for diverse reasons which includes improved security, performance, centralization, lower hardware requirements, and cost savings to mention just a few.

## How VDI works

Due to the fact that VDIs are supported by an extensive collection of Virtual Machines that run on top of hypervisor software, VDI environments can become more complex even than remote desktop environments. VDI makes use of server hardware to execute desktop operating systems (OS) such as Windows or Linux, or other software programs, on a VM with the desktop OS hosted on a rather centralized server in a physical data center. Cloud providers

basically offer two distinct types of virtual desktops and they are persistent and nonpersistent with each of them having their own advantages for different use cases. A persistent virtual desktop is a very good choice for users like developers and IT professionals; offering the necessary persistent environment for users that need heightened permissions. Since they provide the greatest degree of personalization and application compatibility, they are usually at a very high cost per user as against the nonpersistent types.

A nonpersistent virtual desktop provides a level of personalization, but then it divides the personalization layer from the underlying operating system. With this, users can sign in to just any VM and also get a unique customized experience, but the customization will not persist and will be taken off once the user signs out of the VM. Non Persistent desktops provide a much lower cost solution per user and are a good choice for knowledge and task workers in an environment like call centers, computer labs, and little retail kiosks.

**Some of the many benefits of using the VDI include;**

- **Remote access, productivity, and device portability**: Workers who are often mobile or usually in the field have the ability to pull up a virtual desktop that has the full range of virtual applications and data like having a mobile office available on demand. With the use of VDI technology, the desktop is not confined to the hardware, you can choose to view your desktop from more than one device be it mobile, laptops, tablets, or even very thin client devices.
- **Enhanced Security**: Since VDI is quite centralized and sandboxed, it can be a basic component of the security strategy of a company. It removes the IT stress of having to deal with very sensitive company data saved locally on client devices. It also helps to store personal applications and information differently from enterprise applications and also aids the protection of both parties.
- **Improved compliance**: VDI most times provides certain aid to organizations on compliance certifications, especially in certain verticals like finance service or the government where there

might be a need to host and also process data so it is in sync with federal regulations or for businesses that operate in Europe where there is a need for them to ensure they adhere t GDPR regulations when having to deal with personal data.

- **IT cost savings and lower hardware requirements**: Since VDI processing is basically server-based, there isn't a need for expensive or cutting-edge hardware. VDI can also aid in saving costs on licensing, other IT infrastructure, hardware refresh deployment, and maintenance and also help with saving costs on investment in devices issued by the company.

# Activity

1. Configure Network policies in your device.
2. Briefly describe remote desktop service and Virtual Desktop Infrastructure.

# CHAPTER 31
# WINDOWS 11 FOR IOT AND EMBEDDED SYSTEMS

A distinct branch of Microsoft's operating systems called Windows for IoT (Internet of Things) and embedded systems is made for devices other than personal computers. These gadgets may include point-of-sale systems, kiosks, industrial machinery, medical apparatus, and numerous IoT gadgets. For these uses, Microsoft often provides specific editions of Windows, such as Windows 11 IoT and Windows Embedded. Windows can be extensively customized to match the unique requirements of the device and application for IoT and embedded devices. To decrease the operating system's footprint, this includes the capability to remove extraneous parts and services. Microsoft provides solutions like Azure IoT Central and Azure IoT Suite to remotely manage and keep an eye on embedded and IoT devices. Building applications for IoT and embedded systems can be done with the help of Visual Studio and Windows IoT Core.

**In this chapter, you will learn about all that has to do with Windows 11 IoT and how you can use this to your advantage.**

## Windows 11 IoT Editions Overview

The Internet of Things now has access to enterprise-class power, security, and manageability thanks to Windows for IoT, a member of the Windows family. Organizations can build their Internet of Things with safe devices that can be swiftly deployed, simply managed, and seamlessly connected to a comprehensive cloud strategy thanks to Windows' embedded experience, ecosystem, and cloud connectivity.

**Windows IoT comes in three different editions;**

## Windows IoT Enterprise

IoT solutions may now benefit from enterprise manageability and security thanks to Windows IoT Enterprise, a full version of Windows Enterprise. All of the advantages of the global Windows ecosystem are shared by Windows IoT Enterprise. Since it is the binary counterpart of Windows Enterprise, you can use client PCs and laptops with the same well-known development and management tools. The PC version and IoT versions, however, have different license and distribution policies.

**These three basic reasons are why customers go with Windows IoT Enterprise;**

- **Productive**: Utilize your existing skills to create and maintain Windows IoT Enterprise devices with robust tools and technologies to swiftly uncover data and accelerate digital transformation.
- **Trusted**: Your devices, data, and identities are secure with Windows IoT Enterprise, offering you peace of mind and assisting you in developing trustworthy IoT solutions.
- **Smart**: Connecting your devices to one another, your network, and the cloud with Windows IoT Enterprise enables you to use data to generate meaningful business insight and open up new business prospects.

## Windows Server IoT 2022

The full version of Windows Server 2022, Windows Server IoT 2022, offers enterprise manageability and security to IoT systems. The entire benefits of the global Windows ecosystem are shared by Windows Server IoT 2022. You may use the same accustomed development and maintenance tools that you use on your general-purpose servers because it is a binary version of Windows Server 2022. The general-purpose version and IoT versions, however, have different license and distribution policies. Only the OEM channel offers Windows Server IoT 2022 licenses with certain designated use rights.

- **Long-term Servicing Channel (LTSC)**: This is the "Long-Term Servicing Branch" release method that you are already

aware of, in which a new major version of Windows Server is issued every two to three years. Users are eligible for mainstream support for five years and extended support for five years. Systems that need a longer servicing window and functional stability should use this channel. The new Semi-Annual Channel releases will not have an impact on deployments of Windows Server IoT 2022 or older versions of Windows Server. While security and non-security upgrades will still be delivered via the Long-Term Servicing Channel, no new features or functionality will be added.

## Windows IoT Core

Windows 11 IoT Core is a version of Windows 11 that is designed for tiny devices that run on both ARM and x86/x64 hardware, whether or not they have a display. The Windows IoT Core documentation offers details on controlling, upgrading, connecting, securing, and other aspects of your devices.

## Developing Applications for IoT

Spending on IoT increased dramatically during the worst pandemic in a century. The pattern appears to be lingering around for a very long time. You should conduct your research before joining this technological creature. Make sure the app is customized to your needs if you intend to produce one (or have a tech partner design it for you). A ready-made solution could appear practical in the short term, but an IoT application requires significant time and financial investment over the long term. Therefore, you must take into account the overall returns on your investment. Based on device data that it gathers and analyzes, an IoT app may help you manage your company, increase productivity, and make better decisions.

**Below are five steps to developing an IoT application;**

## Define the requirements for the application

Defining the purpose and scope of your IoT application is a crucial first step in its development. You must do this by narrowing your goal

down to its most basic components.

**Decide what you want the app to accomplish once it is live. The objectives could be;**

- Real-time movement or location tracking that enables consumers to keep track of where their gadgets are at all times (such as with delivery chain-owned EVs)
- Monitoring temperature or humidity could assist you in controlling heating and cooling systems (for example, in hospitals).
- Use sensors in industrial facilities (like refineries) to identify dangerous gases including carbon monoxide, methane, and hydrogen sulfide

**The functionality you need will be included in the application's scope. This might comprise:**

- Device Management
- Dashboarding
- Device to Mobile Communication
- Remote Shell
- Over-the-air updates
- Device Shadow
- Metadata Shadow
- Metadata Management
- Data Visualization

You can create an IoT application that will speed up your operations and reduce your costs once you've defined the criteria for it.

## Choosing the Right Hardware

The hardware you use will depend on the needs of your project. It could consist of wearables, GPS trackers, or sensors. However, it's crucial to use tools that are dependable and pertinent to your job. Take a look at the available sensors. For instance, you will need oxymeters, pedometers, and pulse monitors if you are designing smartwatches. However, you will require different sensors, such as GPS or altitude monitors, if you are creating smart automobiles.

Based on whether your device is consumer-based, industrial, or automobile-focused, there is a need for you to locate sensors that are appropriate. Industrial and automotive sensors need to be a lot more reliable than the ones that are on consumer devices due to the fact that they usually undertake more sensitive tasks. Once you have been able to take care of the sensors, there is also a need for you to concentrate on the larger hardware architecture and get to understand if there is a need for microcontrollers or microprocessors on the device in order to have data processed. You also need to consider the kind of programming language you would be using. The most used languages for IoT development are C/C++, Python, Javascript, and Java.

All of the above-mentioned details might seem overwhelming, however, it is quite important to get them right as modifying your own hardware down the road might be time-consuming and also quite expensive.

## Find the right connectivity protocols

There are various network protocols that you can choose from such as Wi-Fi, 2G, 5G, Bluetooth, LoRa, and Zigbee; based on your device's availability of resources, there is also a need for you to ensure you choose the right channels for proper connectivity. If your devices are often used in a home or office space, for instance, you can choose to make use of Wi-Fi for data transmission. Also, if your devices will be mobile or will be used in remote locations, you might want to make use of GSM. Also, a companion device like a smart watch can also make use of Bluetooth. Just like firmware, it is very unlikely that you will be able to alter this choice once you have chosen one, hence it is very important you think this through properly before you make your choice. This can also affect your cost structures. The inclusion of GSM connectivity will lead to you incurring cellular data charges on the flip side with the use of Wi-Fi and Bluetooth, these charges will not exist.

## Ensure the firmware is well-equipped

Firmware, or device-side software, is the technical term for the program that executes your hardware. It is necessary to be sure that your firmware is well equipped, or else you may experience data loss, and then spend a lot more on data storage and transmission than you ought to.

**Ensure that your firmware possesses the following capabilities;**

- Retries for pushing data on network disconnections so that issues that may arise due to connectivity will not lead to data loss.
- Disk persistence in the absence of a network for longer periods of time. This is really needed if your device will be mobile or will be located remotely.
- Batching and compression to save data costs. Data costs can accumulate over time and seriously have an adverse effect on your ROI.
- Data encryption with the use of TLS enables you to be sure of data security for data that are quite sensitive.
- Reliable downloads of over-the-air update images will make sure that there are regular updates that help with the improvement of the efficiency and performance of the device over time.

## Choose the right cloud platform

**The correct IoT platform will give you the required tools to design an application that serves your purpose. In order to pick an IoT platform that works well for you, take a look at the following;**

- Uptime
- Data Security
- Debugging
- Feature Stability
- Security
- Migration Capabilities
- Connectivity
- Scalability

## Note

IoT security is extremely important. IoT is quite a new and dynamic technology which means that changes are bound to be experienced over time. Hence, the security protocols for most IoT projects are usually not well specified. Furthermore, each device in your project can have an issue with security if they are not well secured.

Your IoT application can be described as the melting pot of all the data that your device receives. It can be utilized for the redirection of your devices or even snooping on your customers. Hence, adequate security is non-negligible. When building your application, ensure that you have all security protocols in place, ensure encryption for all the data being saved and sent, and then make use of the needed access control.

# Deploying Applications for IoT

Making your IoT software and related hardware components accessible and functional in a real-world setting constitutes the process of deploying IoT applications. With a successful deployment, you can be sure that your IoT application will function consistently, gather and process data as intended, and achieve the objectives you set for your IoT project.

**The essential steps for deploying IoT apps are listed below:**

- Ensure that the **IoT devices are well assembled,** connected to power sources, and securely mounted or positioned in the target environment. This step can also include physically setting up sensors, actuators, and any other important hardware components.
- Configure **the network connectivity for your IoT devices**. This also can include the connection of devices to Wi-Fi, Ethernet, cellular networks, or any other communication method based on the needs of your project.

- Load **the needed firmware or software onto each IoT device**. Make sure that the software is well installed and that it can be executed on the hardware of the device without any problems. **a secure positioning process for each IoT device.**
- This includes securely authenticating and onboarding devices into your IoT ecosystem, making sure they have the needed access rights to establish communication with your application.
- Configure **each IoT device** with the right settings which include network credentials, data processing parameters, and calibration values for sensors. Note that calibration ensures accurate data collection.
- Add **necessary security measures like device authentication, encryption, and process control to ensure the devices and data are well protected from unauthorized access or tampering.**
- Test **each of the IoT devices** well to be sure that it is functioning properly in the target environment. Ensure you test transmission, sensor accuracy, communication with the central server or cloud, and error handling.
- Configure **various mechanisms** for the routing of data collected by IoT devices to the appropriate destinations. This may involve the aggregation of data locally on the devices or having to send it directly to cloud services.
- Configure the central server or cloud infrastructure to get and process data from IoT devices, Configure databases, data storage, and analytics tools as you ought to.
- Develop **user interfaces or dashboards** for keeping tabs and interacting with IoT data. Make sure that the data shown is done in a nice way and also an actionable way for end-users.
- Put in place various monitoring systems that can help in tracking the health and performance of IoT devices and applications. Configure alerts for critical events or disturbances that may arise.
- Ensure **that your deployment complies with the necessary industry standards and regulations,** especially if your

application makes use of sensitive data or safety-critical functions.

- Be **sure to also document the deployment process**, configuration settings, and troubleshooting procedures. Give training to users and support personnel.

## Deploying Windows 11 on Embedded Devices

A microprocessor-controlled computer hardware system that employs specialized software to carry out a particular task is referred to as an embedded system. The hardware that this software is executing on is referred to as an embedded device. Dedicated or single-purpose devices are other names for embedded devices. They are either standalone systems or devices, or they are a component of a bigger system or device that carries out tasks. Real-time function calculations are handled by the integrated circuit in the core. The complexity of an embedded device is dependent on the task it is designed for. Certain devices have single microcontrollers, some others consist of processors, and some make use of peripherals and even networks. Not every embedded device has a user interface. Although, there are some systems that make use of complex graphical interfaces.

Furthermore, there are many various types of embedded devices, their diversity explains why they are so widespread in today's market. Examples can be found in your household, for instance, your microwave, or in more exotic places like in aerospace technology. 98% of almost all microprocessors produced today are used in embedded devices. Embedded devices have many components that make sure that the device functions well without having any form of breakdown or malfunction.

**Below is a list of hardware components that are known to make use of embedded devices;**

- Microcontrollers, which can also be referred to as digital signal processors (DSP)
- Field programmable gate arrays (FPGA)
- GPU technology

- Gate arrays
- Application-specific integrated circuits (ASIC)

The above processing systems are linked to other related components that have the duty to manage electrical and mechanical interfaces. Programming instructions for embedded systems are also referred to as firmware. They are saved in read-only memory or in flash memory chips that execute on limited components or hardware resources. In order for the embedded devices to be quite useful to users, peripheral devices like displays are usually linked. With all of the above in view, the world of embedded systems promises new inventions as it grows at a very rapid pace and is driven by innovation topics like artificial intelligence, virtual reality, augmented reality, machine learning, deep learning, and the Internet of Things. It takes multiple steps to customize, install, and configure Windows 11 on embedded systems for use in particular embedded applications. **Windows 11 is primarily made for regular desktop and laptop computers, however, with the following considerations, you can adapt it for embedded systems:**

- Ensure **that you have the right licensing from Microsoft** for your embedded deployment. Microsoft provides various license options for embedded systems, which also includes Windows 11 IoT Enterprise, which is created for embedded and specialized devices.
- Check **that your embedded hardware meets the minimum system requirements for Windows 11**. Pay rapt attention to CPU, RAM, storage, and other hardware components. Windows 11 especially needs more resources than its predecessors hence there is a need for you to be sure that your hardware can handle it.
- Design **a custom Windows 11 image** that is created specifically to meet your embedded device needs. You can choose to make use of tools like Windows Assessment and Deployment Kit (ADK) to create custom images that have only the needed components and drivers.

- Be **sure that you possess drivers** for all of the hardware components in your embedded device. Get these drivers integrated into your own custom Windows 11 image or get them available for installation while the setup process is ongoing.
- Choose **your preferred method of deployment** that is most suitable for your embedded device. This could mean you making use of tools like Windows Imaging and Configuration and Configuration Designer (ICD), Windows Deployment Services (WDS), or any other deployment solutions that match what you need.
- Configure **unattended installation scripts with the use of an XML file** for the automation of the Windows 11 installation process on your embedded devices. This will guarantee consistent installation across various devices.
- Customize **the Windows installation** such that it meets the specific needs of your embedded device requirements. This may also include having to configure the settings, setting up user accounts, and choosing the specific features and applications to include.
- Put in place specific security measures needed for your embedded system. This should include setting up firewalls, and antivirus software, and also securing remote access if need be.
- Ensure **you test the Windows 11 deployment on your embedded device** to be sure that it is functioning properly and is also reliable in the target environment. Test diverse scenarios and edge cases to get to know and address potential problems.
- Put **in place data backup and recovery mechanisms** for the protection against data loss and system failures.
- Be **sure that your embedded deployment** complies with industry standards and regulations, especially if your application has to deal with sensitive data or safety-critical functions.

Windows 11 deployment on embedded devices calls for thorough preparation and consideration of the unique requirements of your application. A successful deployment requires cooperation between hardware engineers, software developers, and experts in embedded systems. Additionally, it's essential to stay current with Microsoft's instructions and deployment tools for embedded systems to guarantee compatibility and support.

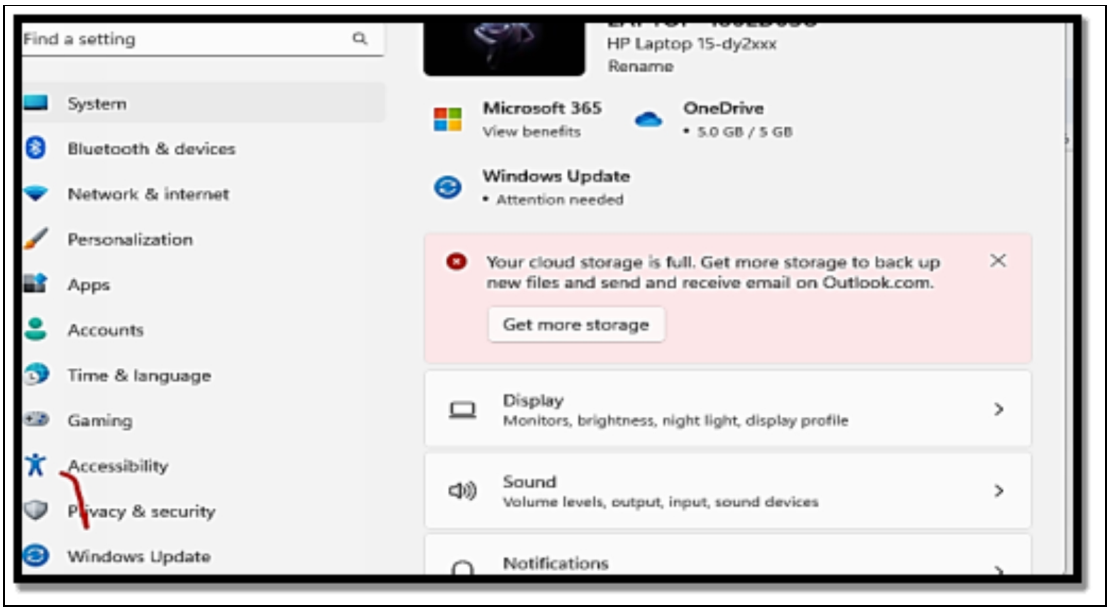
## Activity

1. Develop an application for IoT.
2. Deploying Windows 11 on an embedded device.

# CHAPTER 32
# WINDOWS 11 FOR ACCESSIBILITY

The most encompassing version of recent Windows operating systems is Windows 11. Compared to Windows 10, this version's accessibility features are significantly simpler to locate and use. You can start by accessing the centralized list of assistive features by using the new Accessibility pane in the Settings menu options. Once you choose a particular feature in the Accessibility pane, you can simply change choices using a minimal number of clicks and bar slides. Once activated, all features stay in effect throughout Windows 11 and the majority of Microsoft products, including software and hardware, until you specifically turn them off. Because of this, accessibility features are advantageous for both temporary and ongoing assistance requirements. By the way, the new line of Microsoft adaptive accessories is intended to function in conjunction with the assistive capabilities in Windows 11. An adaptable mouse, a hub, and buttons are offered. These add-ons are made to either modify existing PC hardware, such as a mouse or keyboard or to completely replace it with better options.

- Click the **Settings (the cog symbol) button** after selecting the **blue Windows Start icon on the taskbar** to start configuring your accessibility options. In the list on the left side of the settings window, look for Accessibility; it is denoted by a human figure as its icon.




The accessibility window will then appear, displaying a comprehensive list of built-in functions divided into the three categories of vision, hearing, and interaction. Choose from the options and follow the instructions to adjust the features to your preferences and comfort level. While many of the updates in Windows 11 are theoretically intended to make it easier for individuals who need it to access it, they also have broad appeal on account of their practicality or beauty. Even with tried-and-true, well-known functions, be prepared to be pleasantly surprised.

New sound patterns that signal Windows starting is enabled or that Dark or Light Themes are being used are a couple of examples. New color and contrast schemes are also available that reduce eye fatigue and significantly enhance screen clarity. Any accessibility features are always available for activation. To be able to independently modify and utilize your device in the way you like or require, it's a good idea to proceed through the setup procedure. Be aware that some accessibility features, like eye-tracking, might need to have extra hardware installed first.

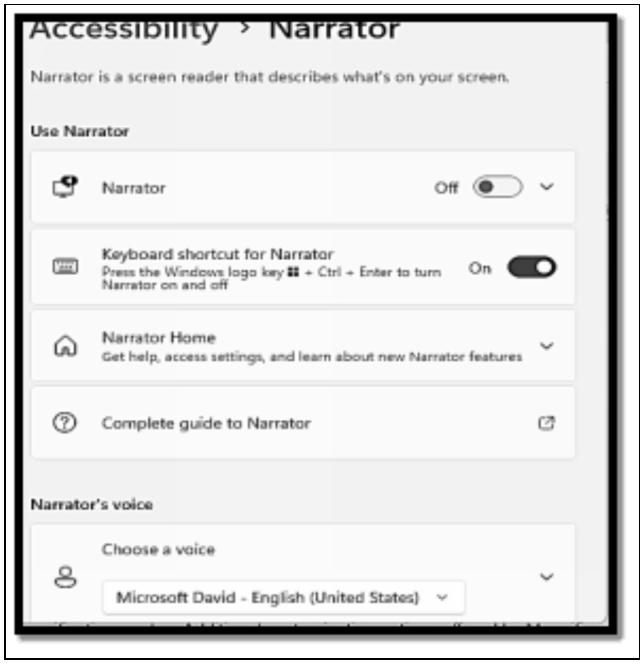
## Assistive Technologies and Features

Users who are blind or visually impaired have access to a number of accessibility tools and assistance technologies in Windows 11.

Windows is committed to accessibility and comfort for all users, with features like a screen reader that may be integrated and customizable display color and contrast options. The best Windows 11 features for those who are blind are listed below.

## Narrator

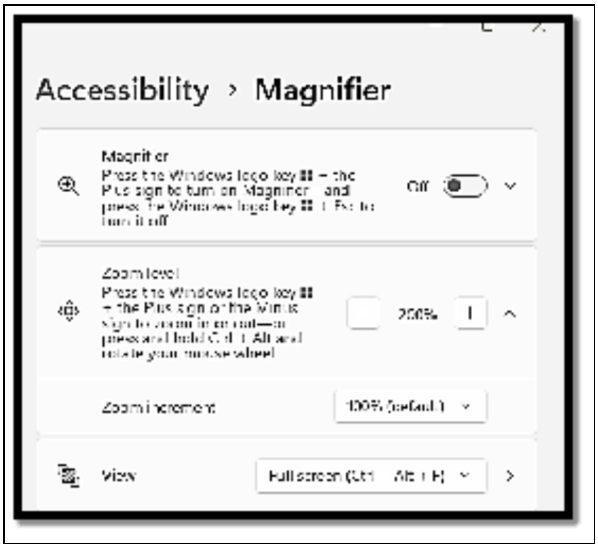
Screen reader software incorporated into Windows 11 is called Narrator. It reads aloud content and offers audio summaries of what's happening on your computer screen. With the help of Narrator, visually challenged users may navigate the Windows interface, and read emails, documents, and webpages, among other things. You can alter the Narrator's settings, including voice volume and speed, to suit your tastes.




## Magnifier

You can zoom in on specific areas of the screen using the built-in accessibility tool known as the magnifier. When turned on, Magnifier makes parts of the screen larger so that text, pictures, and other graphic components are easier to see. Select between the whole screen, lens, and docked magnification modes. Additional customization options offered by Magnifier include modifying the

enlarged area's color, size, and positioning in addition to the magnification level.




## High Contrast Mode

Change the Windows interface's color palette to use High Contrast mode to make it simpler to tell between various visual components. When enabled, the interface's text and other elements are changed to a high-contrast color, such as white or yellow, while the screen's background color is turned to black. You can alter the color scheme and line thickness that surrounds graphic objects when the High Contrast option is activated.

## Speech Recognition

With speech recognition, you can use voice commands to operate your smartphone. The Speech Recognition function records your spoken words through the microphone and converts them into text or commands that the computer can interpret. You can voice commands to open programs, navigate menus, dictate text, and control the cursor when Speech Recognition is turned on. Speech recognition software can get more accurate over time as it becomes more adept at identifying your speech.

## Using Narrator with Braille support

On one of the numerous supported Braille display devices, users who are blind or visually handicapped can use Narrator to read Braille characters. This makes it possible for users who are blind or have vision problems to follow along with the spoken text. Users can change the Braille code used, the number of Braille cells displayed at once, and the input and output settings for the Braille display. Low-vision individuals can read text on the screen without relying exclusively on audio input by using Narrator with Braille.

## Eye Control

Utilize eye-tracking technology to control your computer with your eye movements. You must connect a compatible eye-tracking device to your computer in order to use Eye Control. Once configured, users can use their eyes to complete a variety of tasks, including choosing items on the screen, navigating through documents or webpages, using an on-screen keyboard to type, and opening the Windows Start menu.

Although using a Windows PC is typically not too difficult for deaf or hard-of-hearing people, some sorts of content are nevertheless unavailable to them. They might find it challenging to converse with others on a video call or listen to an audio speech without subtitles, for instance. Thanks to certain clever features built into Windows, you can take part in these activities even if you are deaf. Below are a few of Windows' accessibility features that can be useful to those who have hearing loss.

## Mono Audio

You should turn on mono audio under the Audio accessibility option if you have hearing loss in one ear. No matter which ear you receive the sound from, it will sound the same since the sound will be processed through a single channel. Simply select the Audio option and turn on the Mono audio toggle; there isn't much else to it.

## Flash Screen for Notifications

Windows has the ability to flash the screen or the open window when a notification is received. This is an excellent method for staying on top of notifications without relying just on audible alerts. You can choose what area of the screen should flash to alert you in the Flash My Screen during audio notifications option under the same Audio accessibility menu.

## Captions

All audio speech can be converted to text using speech-to-text in Windows, which can then display the text as floating captions on the screen. Windows will therefore translate the audio in real time and display to you what is being said, whether you are on a call or watching a video on your preferred website. The translation won't be exact, but it will be adequate to grasp the meaning of the sentence.

You need the most recent version of Windows 11 (22H2) in order to use the captions feature. The feature can be activated or off by pressing Windows+Ctrl+L, and it will automatically transcribe audio speech when it is detected. You can alter how the caption appears by using the Captions accessibility feature. This comprises the font's size, opacity, color, and other design elements.

## Third-Party Accessibility Software

Although Windows 11's built-in features are helpful, you might also want to be able to utilize a particular tool or have access to other

accessibility options. You might wish to look at assistive technology created by Microsoft partners if you have those kinds of demands. There is less need for troubleshooting because these are interoperable with Windows and other Microsoft products, and setting up devices and apps is typically simpler and quicker.

## NVDA

NVDA enables blind and visually impaired people to communicate with the Windows operating system and many third-party apps." NVDA is a free application that works with the Windows operating system and a variety of other apps.

## ChromeVox (Chrome)

Chromebooks include a screen reader called ChromeVox that allows persons with vision problems to use the Chrome operating system.

## JAWS

JAWS, or Job Access with Speech, is the world's most common screen reader, designed for computer users who are unable to see screen information or navigate with a mouse due to eyesight loss.

## Accessibility Testing and Best Practices

Accessibility testing is an important part of developing software and web applications. It assures that digital products can be used by people with disabilities, such as those who have visual, auditory, motor, or cognitive impairments. You may make your digital material more inclusive and compliant with accessibility standards such as the Web Material Accessibility Guidelines (WCAG) by doing accessibility testing and adopting best practices.

**Here are some of the most important parts of accessibility testing and best practices:**

## Disabilities to Consider

Recognize the numerous forms of limitations that can have an impact on how people interact with digital content. This encompasses visual (e.g., blindness, low vision), auditory (e.g., deafness, hearing loss), motor (e.g., limited mobility), and cognitive (e.g., dyslexia, cognitive disorders) impairments.

## WCAG Compliance

Learn about the Web Content Accessibility Guidelines (WCAG), which provide a comprehensive framework for making web content accessible. The guidelines are divided into four categories: perceptible, operable, understandable, and robust (POUR).

## Testing Tools

To assist in identifying accessibility issues in your digital content, use accessibility testing tools and software. These tools can detect common issues and make recommendations for improvement. Manual testing tools such as Axe, WAVE, and screen readers are examples.

## Keyboard Navigation

Ascertain that every functionality, including forms, buttons, and links, is accessible and usable via keyboard navigation. Users with motor disabilities frequently use keyboards or other assistive devices.

## Semantic HTML

To organize text, use semantic HTML elements such as headers, lists, and landmarks. Semantic markup aids screen readers and other assistive technology in comprehending the material and providing a better user experience.

## Alternative Text

All photos, icons, and graphics should have descriptive and useful alt text. Alt text is critical for visually impaired people who rely on screen readers to understand visual material.

## Text Contrast

Make sure the text has enough contrast with the background to be readable. Limited contrast can be difficult for those with limited vision.

## Text-to-Speech Compatibility

Test your material with text-to-speech (TTS) software to check that it can be read aloud accurately and clearly. Pay close attention to pronunciation, punctuation, and sentence structure.

## Video and Audio Accessibility

Captions and transcripts should be provided for video and audio content. This helps comprehension in noisy or quiet surroundings and benefits people with hearing problems.

## Activity

1. What are assistive technologies?
2. Mention four assistive technologies and how best you can make use of them.
3. What methods can be implored in testing accessibility features?

# CHAPTER 33
# EDGE COMPUTING AND WINDOWS CONTAINERS

With the use of Edge computing, devices in remote locations are able to process data at the edge of the network, either with the use of a device or a local server. When data has to be processed in the central data center, only the most important data will be sent, hence reducing latency. Businesses make use of edge computing, the large amount of data produced by edge devices has the capability to overwhelm most of the business networks today, hampering all operations on an affected network. IT costs have the potential to increase greatly, customers that are not satisfied can also take their business somewhere else. Machinery of high value can be damaged or simply be rendered less productive. Most importantly, the safety of workers might also be compromised in various industries that depend on intelligent sensors to ensure they remain safe. Edge Computing helps enterprises with the optimization of their day-to-day operations by swiftly processing huge volumes of data near the local sites where the data is being retrieved. This can be more efficient than having to send all of the data collected to a centralized cloud or to a primary data center many time zones away, which would lead to excessive network delays and issues with performance.

Edge computing also helps to bypass centralized cloud and data center locations in order to enable companies to process data faster and more reliably, in real time, or something really close to it. Take into consideration the data latency, network bottlenecks, and diminished data quality that might arise when attempting to send information from thousands of sensors, cameras, or other smart devices to a central office at the same time. As against that, edge computing allows devices at or near a network edge to immediately alert important personnel and equipment to mechanical failures, security threats, and some other important incidents so that immediate action can be taken. Containers are a technology for

packaging and running Windows and Linux software in a variety of on-premises and cloud environments. Containers provide a lightweight, isolated environment that makes app development, deployment, and management easier. Containers start and stop quickly, making them perfect for apps that must react to changing demand swiftly. Containers' lightweight nature also makes them an effective tool for enhancing the density and use of your infrastructure.

In this chapter, you will be introduced to the basics of Windows Containers, you will learn about deploying microservices with the use of containers and you will also learn about Kubernetes and container orchestration.

## Introduction to Windows Containers

A container can be described as an isolated, lightweight package for executing an application on the host operating system. Containers are built on top of the host operating system’s kernel; which can be thought of as the buried plumbing of the operating system. While a container happens to share the operating system’s kernel of the host, the container does not get unfettered access to it. Rather, the container becomes an isolated and in some cases virtualized view of the system. For instance, a container can gain access to a virtualized version of the file system and registry, but then any alteration will affect just the container and will be discarded when it comes to an end. To get the data saved, the container can choose to mount persistent storage like an Azure Disk or a file share which also includes Azure Files.

A container builds at the top of the kernel, but the kernel does not offer all of the APIs as well as services an application will need to execute- most of these are provided by system files that execute above the kernel in user mode. Since a container is isolated from the user mode environment of the host, the container has a need for its own copy of these user mode system files, which are packaged into something described as a base image. The base image works as the

base layer upon which the container is built, offering operating system services not offered by the kernel. All containers are created from container images. A container image is a bundle of files arranged into a stack layer that resides on your local machine or in a remote container registry. The container image has user-mode operating system files that need to offer support for your application, any runtimes or dependencies of your application, and another miscellaneous configuration file your application needs to ensure it executes normally.

**Microsoft provides various images that can be used as a starting point in the building of your own container image;**

- Windows- This has a full set of Windows APIs and system services.
- Windows Server- This has the full set of Windows APIs and system devices.
- **Windows Server Core:** a smaller image containing a portion of the Windows Server APIs, essentially the entire.NET framework. It also comprises the majority, but not all, server roles.
- **Nano Server:** the smallest Windows Server image and includes support for the .NET Core APIs and certain server roles.

Container images, as previously stated, are made up of layers. Each layer contains a collection of files that, when combined, constitute your container image. Because containers are tiered, you don't always have to target a base image when creating a Windows container. Instead, you might choose another image that already has the desired framework. The.NET team, for example, releases a.NET core image that includes the.NET core runtime. It eliminates the need for users to repeat the process of installing the .NET core by allowing them to reuse the layers of this container image. The.NET core image is created on top of the Nano Server.

## Container Users

## Developers

Containers enable developers to create and release higher-quality programs more quickly. Developers can use containers to generate a container image that deploys in seconds and is the same across environments. Containers provide an easy way for teams to share code and start a development environment without affecting the host disk. Containers are portable and adaptable, capable of executing apps written in any language, and are compatible with any computer running Windows 10, version 1607, or Windows Server 2016 or later. Developers can design and test a container locally on their laptop or desktop, and then deploy that same container image to their company's private cloud, public cloud, or service provider. Containers' inherent adaptability facilitates modern app development techniques in large-scale, virtualized cloud settings. The ability to isolate your environment so that your app always gets the version of libraries that you choose, avoiding conflicts with dependencies, is possibly the most useful feature for developers.

## IT Professionals

Containers aid admins in the creation of various infrastructures that are much easier to update and maintain, and that also more completely make use of hardware resources. IT professionals can make use of containers to offer standardized environments for their development, QA, and production teams. With the use of containers, system administrators abstract away differences in having to operate system installations and the underlying infrastructure. You can also make use of the interactive models of containers to execute conflicting instances of a command line tool on the exact same system.

## Orchestration

Orchestrators are a critical piece of infrastructure when configuring a container-based environment. While you are able to control a few containers manually with the use of Docker and Windows, applications often make use of five, ten, or even hundreds of containers which is where orchestrators come into play. Container orchestrators were **designed to aid the management of**

**containers at scale and in production. Orchestrators aid the growth of containerized applications at scale, providing functionality for;**

- Deploying at scale
- Workload scheduling
- Health monitoring
- Failing over when a node fails
- Scaling up or down
- Networking
- Service discovery
- Coordinating app upgrades
- Cluster node affinity

## Deploying Microservices with Containers

Applications have become quite specific-oriented and much lighter, with the need to perform across various environments, which also includes the cloud and on devices with much lower processing power. Microservices being loosely coupled and independently deployable smaller services, have a need for a platform that offers support to lightweight deployable capabilities. Container technology emerged as the preferred choice as a deployment platform for microservices which is due to characteristics such as being light, modular, or portable. A container is a logical packaging of the microservice/application, isolating it from the surroundings in which it is being executed. This enables container-based microservices/applications to be deployed with so much ease, irrespective of the target environment which could be a private data center, the public cloud, or even a personal computer. A single container can be used to execute a microservice or even a software process for a much larger application. The container has all of the needed executables, binary code, libraries, and configuration files. Microservices enables developers to make use of just any programming language that they are quite comfortable with. Furthermore, as developers deal with a smaller codebase when compared to a large monolithic application the accompanying complexities and dependencies are quite low. This offers support for

the DevOps and CI/CD development approaches well. A total application, basically consisting of various microservice instances can be designed, tested, and deployed quickly.

There is no need to align the underlying performance or design of other microservices because microservices communicate via language-neutral application programming interfaces (APIs) such as Representational State Transfer (REST). This provides developers with numerous possibilities, such as storing data from a microservice in a combination of NoSQL databases, MongoDB, MySQL, or Cloudant, allowing the application and developers to use the most appropriate database to store diverse data types. Furthermore, unlike in monolithic applications, a portion of the application failing due to a bug or error does not in any way make the total application crash when you happen to deploy through microservices. The microservices with bugs and errors can be swiftly noted, corrected, and deployed. This would have been quite more complicated in a monolithic application as the whole application would have needed to be debugged, corrected, and recompiled. Microservices are deployed utilizing virtual machines or containers. Because containers are lightweight, portable, and modular, they are the preferred deployment method for microservices. The container image with the microservice code is packaged and deployed as a container service. This method enables rapid scalability of container instances and orchestration tools like Kubernetes aid in managing a cluster of containers as a unified logical system. Large implementations run on several hosts, with orchestration tools allowing cluster discovery, replication, and management.

Using containers to deploy microservices is a typical strategy in current software development and deployment. Containers offer a lightweight and consistent manner of packaging, distributing, and running microservices across several environments.

**The following are the steps for deploying microservices using containers:**

- Start with **developing your microservices**. Each microservice ought to be designed to perform a certain function or feature within your application. Make sure that they are decoupled and can also operate independently.
- Containerize **each of the microservices with the use of containerization technologies like docker.** Design a Dockerfile for each microservice to define its dependencies, runtime environment, and how it ought to be packaged into a container image.
- Design c**ontainer images for your microservices and push them to a container registry like Docker Hub, Amazon ECR, Google Container Registry, or a private registry**. This enables you to save and also version your container images centrally.
- Select **a container orchestration platform to manage your microservices.** Kubernetes is a very popular choice, but alternatives like Docker Swarm, Amazon ECS, and Apache Mesos are also options. Kubernetes especially offers robust features for orchestrating containers.
- State t**he configuration for your microservice within the orchestration platform**. This ought to include the specification of the number of instances each microservice ought to run, resource constraints, networking, and service discovery.
- Implement **service discovery mechanisms to enable microservices to locate and communicate with one another.** Kubernetes, for instance, offers a built-in DNS service for the purpose of service discovery.
- Set up **load balancing to share incoming traffic to your microservices**. Kubernetes has a built-in load balancer for the purpose of routing traffic to pods (containers).
- Implement **monitoring and logging solutions in order to track the health and performance of your microservices.** Tools like Prometheus, Grafana, and ELK stack are commonly used for this purpose.
- Configure **autoscaling based on metrics such as CPU usage or incoming requests**.

- Put **in place security measures like role-based access control.**

## Kubernetes and Container Orchestration

Container orchestration is the automation of container provisioning, deployment, networking, and scalability, availability, and lifecycle management. Kubernetes is the most popular container orchestration platform today, and most major public cloud providers, including Amazon Web Services (AWS), Google Cloud Platform, IBM Cloud, and Microsoft Azure, provide managed Kubernetes services. Docker Swarm and Apache Mesos are two other container orchestration systems. While different tools and approaches have different methodologies and capabilities, container orchestration is fundamentally a three-step process (or cycle, when part of an iterative agile or DevOps pipeline). A declarative configuration model is supported by the vast majority of container orchestration tools: A developer creates a configuration file (in YAML or JSON, depending on the tool) that defines a desired configuration state, and the orchestration tool executes the file and applies its own intelligence to achieve that state. Normally, the configuration file

- Specifies the container images that make up the application, and where they are positioned.
- Provide the containers with storage and other resources.
- Specifies and secures the network connections between containers.
- Dictates versioning

The orchestration tool helps with scheduling the deployment of the containers to a host, choosing the best host based on available CPU capacity, memory, or other requirements or constraints indicated in the configuration file. Upon the deployment of the containers, the orchestration tool helps to manage the lifecycle of the containerized application based on the container definition file.

**This includes;**

- Managing scalability, load balancing, and resource allocation among the containers.
- Make sure of the availability and performance by relocating the containers to another host in the case of an outage or a shortage of system resources.
- Collecting and storing log data and any other telemetry that is used in the monitoring of the health performance of the application.

It's undoubtedly obvious that the primary benefit of container orchestration is automation - and not just because it dramatically reduces the work and complexity of administering a large estate of containerized applications. Orchestration facilitates an agile or DevOps strategy by automating operations, allowing teams to create and deploy in rapid, iterative cycles and release new features and capabilities more quickly.

Furthermore, the intelligence of an orchestration tool can augment or extend many of the intrinsic benefits of containerization. For example, automated host selection and resource allocation based on declarative configuration optimize computing resource efficiency; automated health monitoring and container migration maximize availability.

# Kubernetes

Kubernetes is one of the most popular container orchestration platforms. Alongside other tools in the container ecosystem, Kubernetes allows a company to deliver a highly productive platform-as-a-service (PaaS) that helps to address many of the infrastructure- and operations-related tasks and issues around cloud-native application development. With these development teams, you will be able to focus exclusively on coding and innovation.

**Kubernetes' advantages over all other orchestration solutions are largely a result of its more comprehensive and sophisticated functionality in various areas which include;**

- **Container deployment.** Kubernetes helps with the deployment of a certain number of containers to an indicated host and keeps them being executed in a preferred state.
- **Rollouts:** A rollout is an alteration to a deployment. Kubernetes enables you to initiate, pause, resume, or roll back rollouts.
- **Service discovery.** Kubernetes can instantly show a container to the internet or to other containers making use of a DNS name or IP address.
- **Storage provisioning.** Developers can enable Kubernetes to mount persistent local or cloud storage for your containers as needed.
- **Load balancing and scalability.** When traffic to a container gets heightened, Kubernetes can empty load balancing and scaling to share it across the network to be sure of stability and performance.
- **Self-healing for high availability.** When a container fails, Kubernetes can restart or replace it automatically. It can also bring down containers that do not meet your health check requirements.

# Activity

1. What are Windows Containers?
2. What are microservices and how can they be deployed with the use of Containers?

# CHAPTER 34
# ADVANCED DISK MANAGEMENT

Advanced disk management refers to the strategies and tools used in a computer system to efficiently manage and manipulate storage devices (usually hard drives and solid state drives). This covers partitioning, formatting, optimizing performance, data recovery, and other operations. Some sophisticated disk management principles and strategies are as follows: Knowing the distinctions between the GUID Partition Table (GPT) and Master Boot Record (MBR) partitioning techniques, Understanding the distinctions between the file systems NTFS (New Technology File System) and FAT32 (File Allocation Table 32), Understanding various RAID levels (for example, RAID 0, RAID 1, RAID 5, and RAID 10) and their uses for data redundancy and performance enhancement RAID array configuration and management for increased data availability and performance Defragmenting disks to improve disk performance, particularly on traditional hard drives. Advanced disk management varies based on the operating system (Windows, macOS, or Linux) and hardware configuration. To effectively manage and maintain storage devices in your computer system, you must have a thorough understanding of these concepts and techniques.

## Dynamic Disks and RAID Configurations

A Dynamic Disk is a hard drive that contains dynamic partitions. When compared to the basic disk partitioning method, this improved disk management scheme is more customizable. For file storage, a dynamic management system will establish partitions (volumes) and logical drives. These volumes are identified by individual drive letters (for example, E :). Following the creation of dynamic volumes (partitions), these volumes can be formatted with FAT, FAT32, or NTFS (New Technology File System). Furthermore, the master boot record (MBR) partition style is supported by both dynamic and basic drives. The GUID partition table (GPT) partition styles are also supported by the two disk partitioning systems.

The modern dynamic disk management method, in contrast to the earlier basic disks, creates partitions (volumes) that span several physical disks. Spanned or striped volumes are dynamic volumes that span multiple physical drives. Unfortunately, spanned or striped volumes do not tolerate errors. You can generate fault tolerance volumes in addition to spanned or striped volumes. RAID-5 and mirrored volumes are the two fault-tolerant dynamic volumes.

**Below are some key aspects of dynamic disks;**

## Volume Types

- **Simple Volume**: A single disk's space is used as a single volume.
- **Spanned Volume**: Combines space from various dynamic disks into one logical volume. It does not offer redundancy but increases storage capacity.
- **Striped Volume**: Also known as RAID 0, this brings together space from various disks for increased performance but with no redundancy.
- **Mirrored Volume**: Offers fault tolerance by duplicating data across two disks (RAID 1),
- **RAID-5 Volume**: brings together three or more disks with shared parity for redundancy and improved performance.

## Volume Expansion

- Dynamic disks enable you to extend the size of a volume without losing data, which can be quite beneficial when your space is limited.

## Volume Shrinking

You are also able to shrink volumes on dynamic disks in order to free up space for other purposes.

## Resilience

Mirrored and RAID-5 volumes offer data redundancy, making sure of data integrity even if one of the disks fails.

# RAID Configurations

RAID setups are collections of techniques for merging several physical disks into a single logical unit. These topologies are commonly used to improve data redundancy, performance, or a mix of the two. RAID levels that are commonly used include:

## RAID 0 (Striping)

- Shares data across various disks for improved performance.
- Provides no redundancy, with this data at risk if any one of the disks fails.
- Usually used for performance-critical applications that can afford data loss.

## RAID 1 (Mirroring)

- Mirror data across two or more disks.
- Offers data redundancy, if one disk fails, data will still be available on the other.
- Often used for very critical data where loss of data cannot be unaccepted.

## RAID 5

- Shares data and parity information across various disks.
- Offers both performance and redundancy,
- Can deal with the failure of just one disk without data loss.

## RAID 10 (1+0)

- Brings together mirroring (RAID 1) and striping (RAID 0).
- Provides both redundancy and performance.
- Needs a minimum of four disks.

## RAID 6

- Looks a little like RAID 5 but with dual parity, enabling it to survive the failure of two disks.
- Offers high redundancy at the expense of certain performance.

## RAID 50

- Brings together RAID 5 and RAID 0.
- Offers performance and redundancy.
- Needs a minimum of six disks.

The decision between dynamic disks and RAID setups is determined by the individual needs of your storage solution. RAID configurations are more extensively utilized across various operating systems and hardware sets, whereas dynamic drives are largely employed in Windows contexts. In server situations where data availability and performance are crucial, RAID is also often used.

## Disk Cleanup and Optimization

Windows 11 Storage replaces Disk Cleanup and improves on it in every aspect, including the incorporation of all of Disk Cleanup's capabilities. Storage Sense, a built-in component of Windows 11 Storage, is one of the features. When your computer's disk space is running short, you can use Storage Sense to swiftly eliminate unneeded items from temporary files and the recycle bin. Furthermore, Storage Sense can be used to upload unnecessary files from your local OneDrive folder to Microsoft's cloud storage. Your data will be securely saved in the cloud, with rapid access to your computer. This process, known as "dehydration," increases storage efficiency while also making your data more accessible. With the help of Windows 11's built-in storage functions, you can recover underutilized storage space, speed up your computer, and keep your data safe. Windows 11 Storage includes cutting-edge capabilities that allow you to forget about your storage issues. If you're not sure what to delete in Windows 11, look through the numerous options accessible within disk cleanup. This will help you understand your alternatives and make an informed decision:

## Temporary Internet Files

When you use the Internet, website data such as photographs, HTML files, and scripts are saved in temporary Internet files. Deleting these files frees up disk space and improves your online security and privacy.

## Downloaded Program Files

This category includes ActiveX controls and Java applets downloaded from the internet. Unless you regularly use applications that require them, it is safe to delete these files to free up disk space.

## System Error Memory Dump Files

If a critical issue occurs, your system creates memory dump files. Unless you are actively engaging with technical assistance to tackle system issues, deleting these files is usually risk-free.

## Recycle Bin

The Recycle Bin stores deleted files until you delete them. Then, if you don't need the files, you can remove them to free up space on your computer.

## Temporary Files

These files, which are generated by programs, are frequently redundant once the duties associated with them have been finished. As a result, deleting them can save up a lot of space. However, do not remove them if you will require them later.

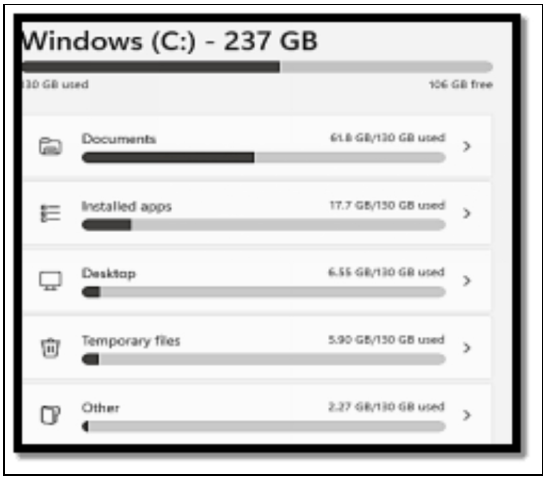
## Thumbnails

To facilitate file navigation, the system generates thumbnails, which are small preview images. While removing them may free up disk space in Windows 11, keep in mind that the system may generate them again if necessary.

## Windows Update Cleanup

After you apply Windows updates, system files from previous versions can accumulate and take up a lot of space on your hard disk. These files will be destroyed if you select this option, clearing up space.

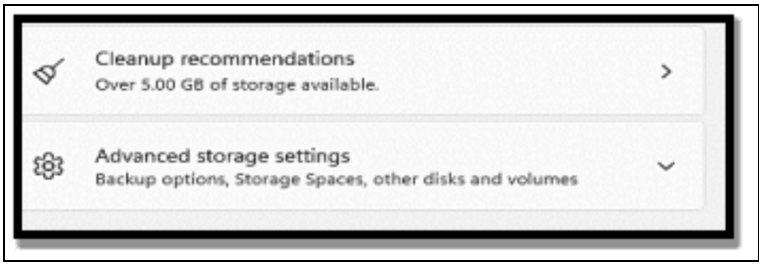
- In the search box on the task, type **disk cleanup**, and choose **Disk Cleanup from the list of results.**
- Choose **the drive** you would like to clean up, and then choose **OK**.



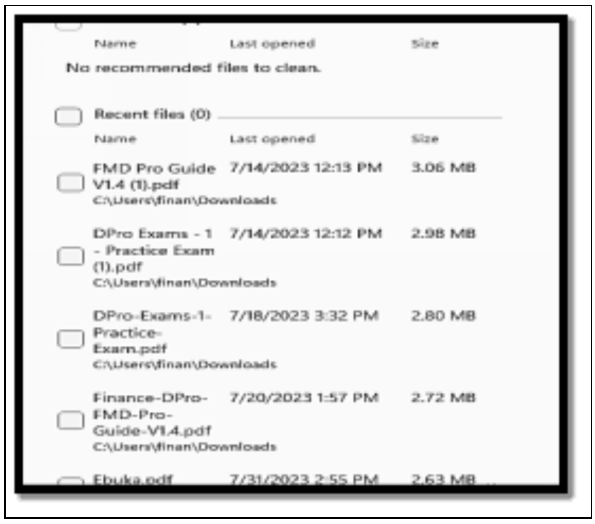

- Choose t**he file types you would like to get rid of**. If you would like to obtain a description of the file type, choose it.
- Choose **Clean up.**

**If there is a need for you to free up more space, you can also choose to delete system files;**

- In Disk Cleanup, choose **to Clean up system files.**




- Choose **the file types to remove**. In order to get a description of the file type, choose it.




- Choose **Clean up.**

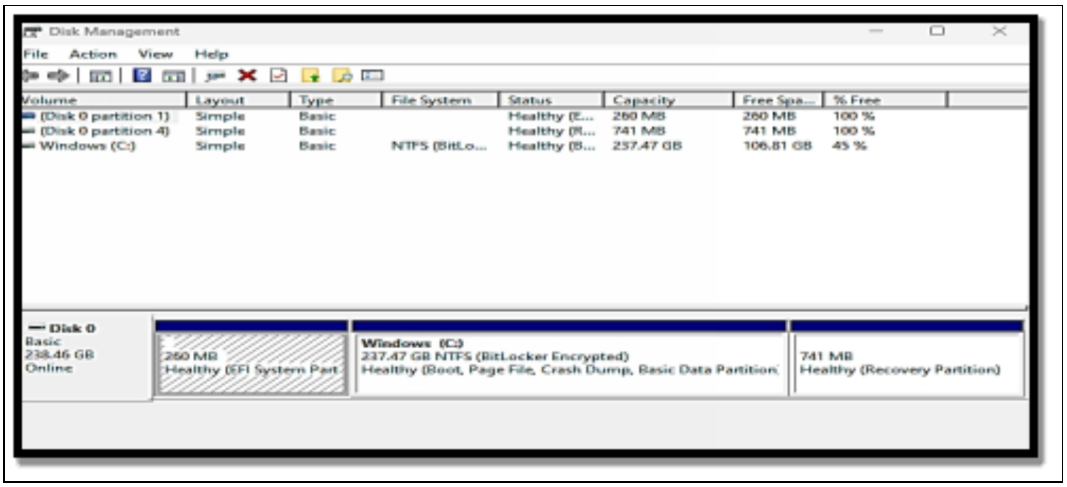
## Resizing and Managing Partitions

When it comes to resizing a disk partition, the first thing that springs to mind is data security. Because resizing a partition essentially means shrinking one partition or extending another, it's difficult to take the initial step without first determining the risk. Resizing and relocating a partition are not the same thing. Moving the partition adjusts the partition's forward and backward position on the disk and does not delete data. Is resizing the Windows partition safe? Yes, you can divide the resizing partition into extending and shrinking divisions. Neither operation deletes data. Hard drive downsizing is the practice of reducing the size of your partition to free up unallocated space on your hard disk. Before your computer can use the space on the hard drive to store data, the drive must be partitioned. Data will not be lost if the partition is reduced. If the partition contains unmovable files (such as the page file or the

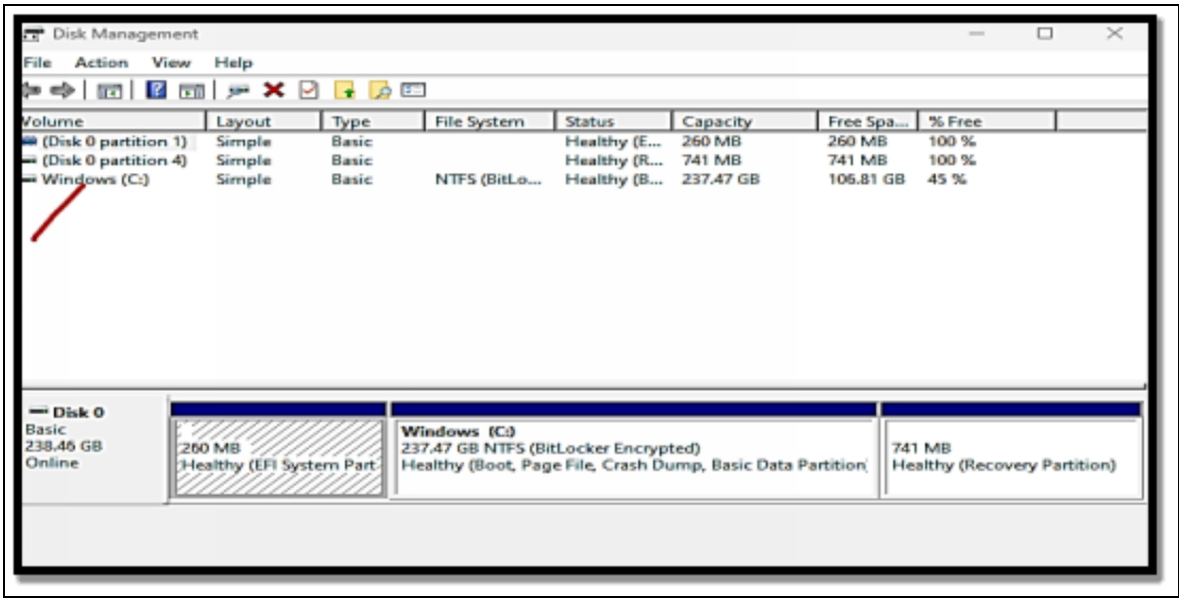
shadow copy storage region), the volume will shrink to the point where the unmovable files are situated. That is, the utilized space with existing data is not available for shrinking space.

**If you would like to shrink a partition without losing data, follow the steps below;**

- Tap the **Windows + R keys** to bring up the Run box, and insert **diskmgmt.msc, choose OK** in order to open Windows Disk Management.




- Right-click **on the partition** that you would like to reduce its size and choose **Shrink Volume.**



- On the **Shrink volume window**, you can see the total size prior to shrinking and the size of available shrink. In this place, you can choose to insert the exact amount of space you would like to shrink. Choose **Shrink** and this will be done within a few minutes.

**Extending a partition in Windows 11 without having to lose data;**

- Go to **Partition Manager**, find the target partition, and choose **“Resize/Move**”.
- Move the partition panel to either the right or the left in order to include the unallocated space into your current partition and choose **OK** to have it confirmed. If you notice there isn't enough unallocated space on your disk, right-click on a **big partition with enough free space** and choose “**Allocate Space**”. Once done, choose **the target partition** that you would like to extend at the allocated space to the column.
- Move the dots of the target partition into the unallocated space and then choose OK. Once complete, choose the Execute Task button and choose **Apply** in order to keep all the changes.

# Activity

1. Clean up the disk on your device.
2. Adjust the size of the disk partition on your device.

# CHAPTER 35
# DATA RECOVERY AND FORENSICS

Data recovery and digital forensics are two independent but related topics concerned with the retrieval and analysis of digital information, typically from storage devices such as hard drives, solid-state drives, and mobile devices. Data recovery is the process of recovering lost or inaccessible data from storage devices as a result of a variety of causes such as inadvertent deletion, disk formatting, hardware failures, or file corruption. Its primary goal is to return data to its original state or as close to it as feasible. Certain key aspects of data recovery include; understanding the causes of data loss, which can range from user error to physical damage to the storage medium, scanning and recovering lost or deleted files with sophisticated data recovery software, and understanding various data backup methods that can be used in the prevention of data loss and also reduce the need for any form of recovery.

The process of researching and analyzing digital material for legal or investigative purposes is known as digital forensics. It entails gathering, storing, analyzing, and presenting digital evidence to assist in investigations and legal actions. Maintaining a strong chain of custody to preserve the integrity and admissibility of digital evidence in court is a key part of digital forensics. Collecting digital evidence using forensically sound ways to ensure its integrity throughout the process ensures evidence preservation without affecting or jeopardizing its integrity by examining digital evidence, such as files, system logs, metadata, and network traffic, to recreate events, identify perpetrators, or gather data for legal purposes. Both data recovery and digital forensics are important in different situations. Data recovery is concerned with the recovery of lost data for personal or organizational use, whereas digital forensics is engaged with the investigation and analysis of digital evidence for legal, criminal, or investigative purposes. To be effective in their professions, professionals in both fields must have a thorough understanding of storage systems, file systems, and digital artifacts.

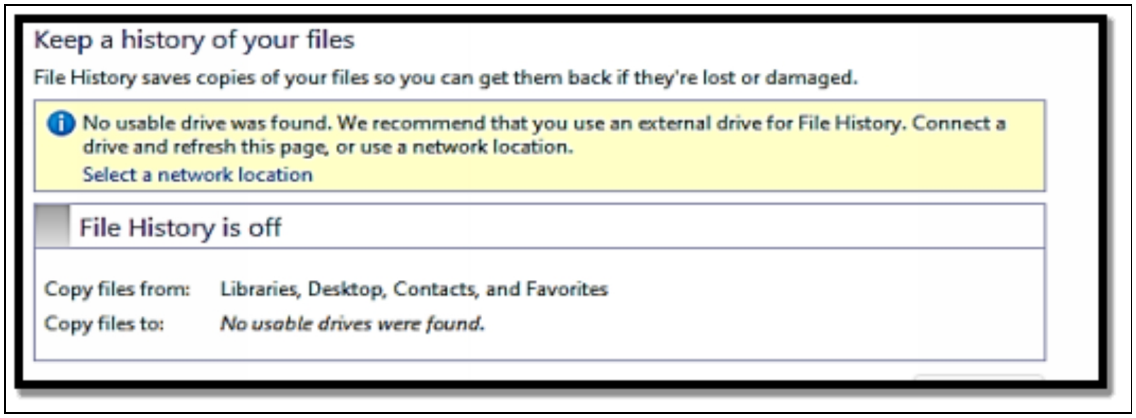
# Windows File History and Previous Versions

File History Windows 11 is still Microsoft Windows' backup software for files and folders. The difference is that it is integrated into the upcoming new system version 11. Windows 11 File History allows users to automatically backup documents such as Documents, Pictures, Music, Videos, Desktop, Downloads, OneDrive, Contacts, and so on to another internal or external hard drive at a frequency of every few minutes, every few hours, or daily. Windows 11 File History allows users to automatically backup documents such as Documents, Pictures, Music, Videos, Desktop, Downloads, OneDrive, Contacts, and so on to another internal or external hard drive at a frequency of every few minutes, every few hours, or daily.

**Below are steps by which you can conduct file backup with the use of File History on Windows 11;**

- Choose **the search icon (magnifier) in the middle of the taskbar** and then type **file history** in the search column in the pop-up window.
- In the results that are displayed, open the best match **File History**.
- It will then open the Windows 11 control panel and lead you to **Control Panel > All Control Panel Items > File History**.

If this notifies you with the following content, there is then a need for you to do as it instructs. “Nousable drive was found. We recommend that you use an external hard drive for File History. Connect a drive and refresh this page or use a network location”.




- If you are content with the default setting which also includes source files and destination selection in the right section, choose the **Turn on button** there in order to enable **File**

**History Windows 11**. If you decide to change your mind while the task is being processed, you can choose to either choose the **Stop option or Turn off File History Windows 11** so as to disable it and also cancel this backup. If there is a need for you to get back the previous File History backup, simply choose **Run Now** or the T**urn on button**.

- If you are not pleased with the default configuration and would like to customize your own settings, simply choose the Select **Drive option** in the left pane. In the new window, select the drive you would like to use as the file backup destination. You can also choose **a network location** as your target storage by selecting the **Add network location option** and choosing **a folder**. Do not forget to choose **OK** in order to have the changes saved and return to the previous page. If the drive you chose has File History you have designed on any other computers, there will be an option known as “I want to use a previous backup on this File History drive”. You can make a choice of this offer and choose a backup drive that already exists which allows you to get Windows 11 file history restored to a new computer. If you have saved **File History backups** to one hard drive on this PC but you need to alter the destination to another disk while the previous target disk is still linked to this machine, it will enable you to drag your previous backups to the new storage. Know also that you can always choose to refuse this, it's not compulsory you make use of it.
- Choose the **Exclude Folders option** in the left menu to filter out folders that you would not like to back up. Simply choose **the Add button** on the new screen and include the items. Also, ensure you do not forget to choose the **Save Changes button.**
- Choose **the Advanced settings** in the left pane to trigger more important settings for this File History Windows 11 process. Behind Save copies of files, you can choose to personalize how often Windows File History will scan for file and folder alterations.

  **The options include;**
  - Every 10 minutes

- Every 15 minutes
- Every 20 minutes
- Every 30 minutes
- Every hour (default)
- Every 3 hours
- Every 6 hours
- Every 12 hours
- Daily

**Behind Keep saved versions, you can choose to decide just how long to keep the Windows 11 File History backup. Note that there are about seven options available for this;**

- Until space is needed
- 1 month
- 3 months
- 6 months
- 9 months
- 1 year
- 2 years
- Forever (default)

Furthermore, you are able to manage backup files manually by choosing the **Clean-up versions option** right beneath and choosing one of the following standards. Upon completion, it will help with the deletion of versions of files and folders older than the chosen age, with the exception of the most recent version of a file or folder.

**All other files and folders like versions that have been excluded or totally removed from your libraries will also be deleted.**

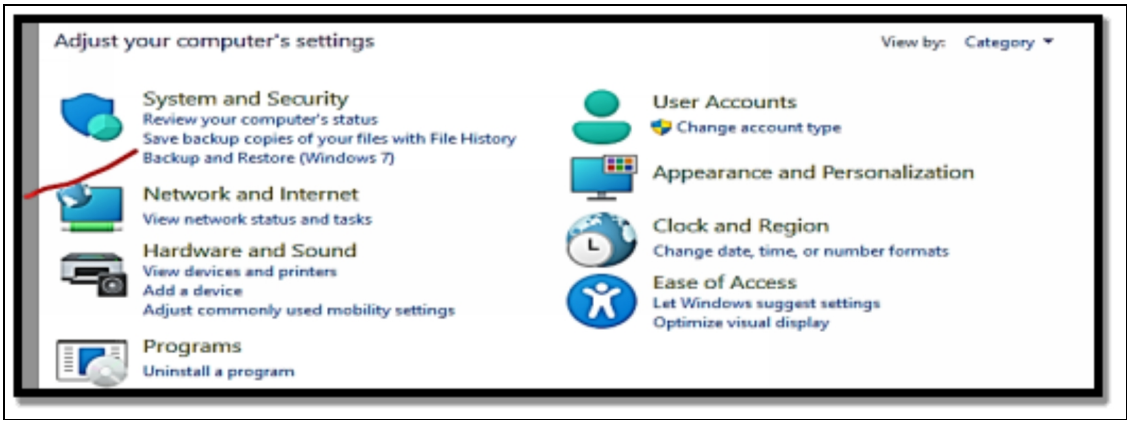
- All but the latest one
- Older than 1 month
- Older than 3 months
- Older than 6 months
- Older than 9 months
- Older than 1 year (default)
- Older than 2 years

# Previous Versions

Previous Versions is a function in File Explorer that allows you to restore prior versions of a file or even recover lost files if you have deleted them from the Recycle Bin. By visiting its Properties, you may view the Previous Versions of a certain hard disk and a specific folder within the hard drive. On a Windows 11/10 PC, the "Previous Versions" function is not activated by default. When you go to earlier Versions, you'll encounter the statement "There are no previous versions available." In this part, you'll learn how to use Previous Versions to restore data on Windows 11/10.

**Connect an external device to the computer and follow these steps to activate Previous Versions from File History in Windows 11.**

- Open **Start on Windows 11.**
- Locate the **Control Panel** and choose the **top result in order to open the app.**
- Choose **System and Security.**




- Choose **File History.**

Once the above steps have been completed, every backup revision that File History creates on Windows 11 will then be available to restore the files with the use of ‘Previous Versions” in File Explorer.

**Follow the steps below to enable System Restore in order to recover files on Windows 11;**

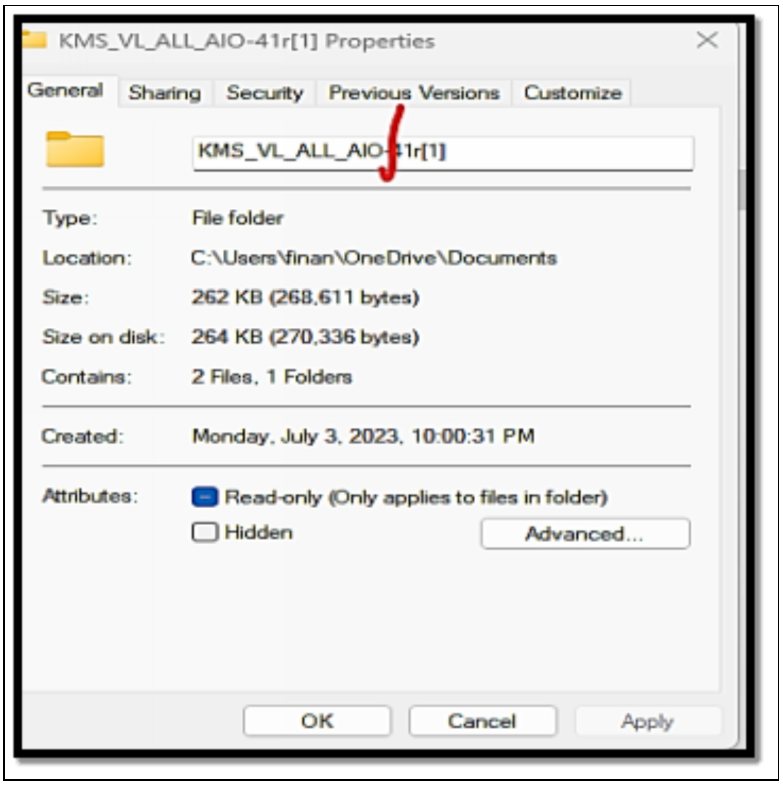
- Open **Settings**
- Choose **System.**

- Beneath the **Device specifications** section choose the **System Protection option.**
- Beneath the **Protection Settings section**, choose the system drive and choose the **Configure button**.
- Choose the **Turn on system protection option**.
- Choose the **Apply button**.
- Choose the **OK button.**
- Select the **Create button.**
- Indicate a description of the restore point. For instance, Restore Point “date” and “time”.
- Choose the **Create button.**
- Select the **Close button.**
- Choose the **OK button**

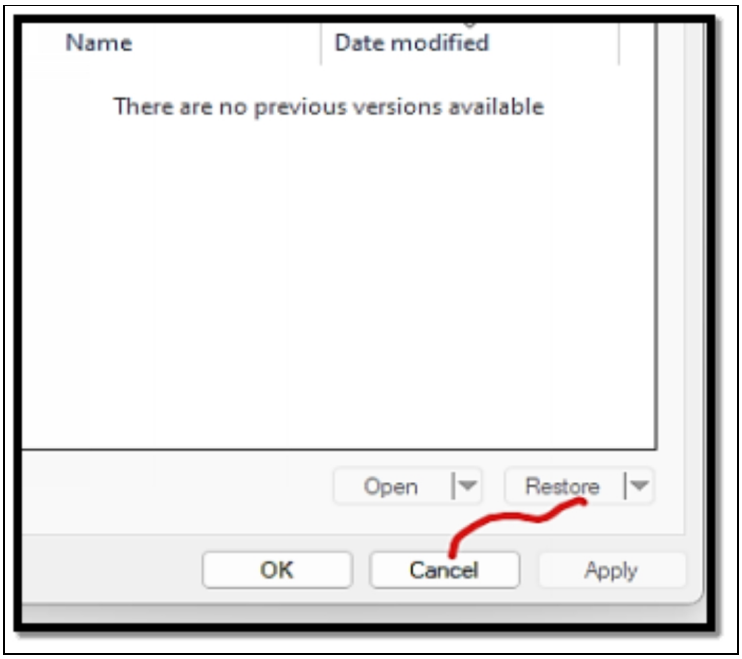
Once the steps have been completed, you can then use the restore points to restore versions of files. Nevertheless, unless you happen to create new restore points in a manual way, the number of previous versions will remain limited on your computer.

**To recover previous versions of a file on Windows 11, follow the steps below;**

- Open **the file explorer.**
- Right-click **the parent folder** with the file to restore and choose the **Properties option.**
- Choose the **Previous Versions tab.**




- Beneath the **File Versions option,** choose **the file version to recover and choose the arrow button close to the Restore button.**




- Choose the **Restore To option**.

- Choose the **location to restore the files or folder.**
- Choose the **Select folder button in order to restore the files.**

Once the above steps have been completed, the file will be restored to the indicated location on Windows 11.

## Using Data Recovery Software

There has been a lot of advancement in the way data has been managed across the world in recent times. People and organizations also have increasingly made use of huge data piles for their businesses. Hence, there is a need for proper data management in order to be sure of the integrity of data as well as its proper storage. Those who are already making use of data recovery software may as well already have a perfect understanding of the reason why there might be a need for file recovery. Some of these reasons are data losses which result from deletion by mistake or corruption of one or more disks. If you happen to lose data now, how to recover the data lost will be the major thing on your mind. There are so many recovery options in today's world but one of the best ways is to employ the use of software to recover deleted files. If you are saving your data in micro SDs or you are making use of an external hard drive, data can be lost with just a single click.

If you happen to delete any file, it will be taken to the recycle bin. The good thing about this is the fact that the recycle bin has a recovery option that enables the recovery of files that have been sent there when they were deleted from the computer. Basically, when a file is deleted, the operating system of the computer will take off the path that leads to where the file was initially. With this, the file will then become inaccessible. The path will continue to be hidden until the files you have deleted become replaced by new ones. Usually, the path is always in the form of a binary number (0 and 1) which are deleted to ensure that the files become inaccessible. Data recovery software is designed with certain unique features that work around the storage device to show the specific sequence of the

binary numbers and also reorganize them to show the files that have been deleted.

With this, you will be able to get the files that have been deleted. There are currently lots of data recovery software in the market. Anyone you decide to make use of should be able to help you get back your deleted files. It is worth noting however that these software are built with varying levels of versatility and they will in no way provide the same recovery rates. A good data recovery software ought to be able to recover the files in their initial state within a very short period of time. Furthermore, it should also be able to recover a wide range of file types from different storage devices available. To make use of software for data recovery is quite simple, all you need to do is download and install the software into your computer and execute it. When you delete files from storage, they are placed in the recycle bin. It is considerably simpler to restore them from there by just selecting and restoring the ones you require. However, if you destroy the files permanently by holding down the "Shift" key, you will have to go the extra mile. The main reason you should use data recovery software is to recover data that cannot be recovered using traditional methods. You also require software for recovery because it raises your chances of recovering the data and makes the process secure.

Finally, when files are erased, the binary numbers vanish and can only be recovered via recovery software. Depending on the extent and type of data lost, you may need to utilize either free or expensive software. Losing data is basically an accidental happening, nevertheless, there are various safe ways by which you can ensure that your data is well secured.

**Below are some of the most important suggestions that will aid the prevention of data loss;**

- Design backups for all of your data.
- Secure and encrypt all of your files and folders.
- Download and install safe and trustworthy antivirus software.
- Protect data with accounts.

# Digital Forensics Basics on Windows 11

Digital forensics on Windows 11 has to do with the process of collecting, analyzing, and preserving digital evidence from a Windows 11 computer or device. This can be quite important in different situations like criminal investigations, cybersecurity incidents, or internal corporate investigations**. Below are some fundamentals for you to get started with digital forensics on Windows 11;**

- Prior to conducting any form of digital forensic activities, it is necessary for you to come to terms with the legal and ethical considerations. Be sure that you have the appropriate authorization and comply with the relevant laws and regulations.
- The first step is to preserve the digital evidence in order to keep its integrity. Stay away from powering off the computer or ensuring that any changes are made to the system. Make use of write-blocking hardware or software so as to be sure that the evidence will remain the same and unaltered.
- Design a detailed record of your actions. Keep a record of the date, time, and location of the investigation and also the names of the individuals involved. The documentation is quite important in court proceedings.
- Make use of specialized digital forensics tools and software to get, analyze, and report on the evidence. Certain popular tools for Windows 11 digital forensics include Autopsy, FTK (Forensic Toolkit), Encase, and open-source options like Volatility.
- Design a forensic image of the Windows 11 system drive. This image should be the exact copy of the drive which should also include all data and metadata. Make use of a write-blocking device or software for the prevention of any alterations during the process of acquisition.
- Design a timeline of vents in order to have a perfect understanding of the sequence of actions on the system. This

can aid the reconstruction of the incident and the identity of the responsible parties.

- The Windows Registry has a wealth of information about system settings and activities of users. Analyze the registry for various clues about user accounts, software installations, and system alterations.
- Examine the file system for files that have been deleted, or hidden, and also for metadata files. Files that have been deleted may still be recoverable, and metadata can offer important context.
- If need be, analyze network traffic logs and choose if the system communicated with malicious servers or if there were any form of unauthorized network activities.
- Prepare a more comprehensive forensic report that has your findings embedded in it. Ensure you add all of the important details, artifacts, and a clear explanation of your analysis process. This report ought to be suitable for use in legal proceedings.

Digital forensics on Windows 11 can be a time-consuming and complex procedure that necessitates a thorough understanding of Windows operating systems, file systems, and forensic methodologies. To properly investigate digital occurrences, it is critical to stay up to date on the latest technologies and practices in the industry. Working in a controlled and secure environment is also essential for preserving the integrity of the evidence.

# Activity

1. What is file history?
2. Configure the file history on your device.
3. What is data recovery software and can you make the best out of it?

# CHAPTER 36
# ENHANCING PRODUCTIVITY WITH POWERTOYS

Do you need to rename more than one file at once, locate your mouse cursor, or swiftly mute your audio while a virtual meeting is ongoing? Microsoft's free PowerToys utility will provide your operating system with a boost. Microsoft initially launched PowerToy for Windows 95 in order to improve productivity and customization capabilities for power users. It was brought back for Windows XP but was not shown again until 2019. Today, PowerToys is now a standalone application for Windows 10 and Windows 11. It has various features you can pick to allow in order to further enhance the operating system. Awake ensures your PC does not fall into sleep mode. Fancy Zones helps with the creation of window layouts for better multitasking. Keyboard Manager can also help remap some keys. PowerRename aids the renaming of various files in just one shot. Initially, downloading PowerToys from its GitHub page was the only way to install it. However, you may now install PowerToys as you would any other app thanks to the release of Windows 11 and the new Microsoft Store. If you open the most recent release, select the PowerToysSetup exe file, then double-click the downloaded exe file, you can still install it via GitHub.

- Upon the installation of **PowerToys**, it will be shown in the Windows System Tray. Click twice on **the icon in order to pen the PowerToys Settings screen**. If the icon does not show, open the **PowerToys shortcut from the Start menu** in order to get the icon of the **System Tray to be displayed.**

Beneath the General screen in PowerToys settings, you are at liberty to decide to execute PowerToys as an administrator which is often needed for some tools. This can help to alter the name of the Windows theme and execute PowerToys at Startup. You are also free to manually check for updates or choose to download updates instantly. All the utilities in PowerToys are instantly turned on, but then you can select each of these utilities to learn about what they do and how you can tweak some of their settings.

## Overview of PowerToys Utilities

In this section, you will learn about the various PowerToys utilities, what they do, and how you can get the best out of them.

## Always On Top

The more windows you open in Microsoft Windows, the more difficult it will be for you to keep one window active always and also make it available in front of the others. With the use of the Always on Top tool, you are able to pin certain windows such that they will always be seen even if you select another window.

- Select the **Always on Top tab** in Power Toy Settings. In this place, you are able to alter the activation shortcut, show the border around the pinned window, and alter the hue and thickness of that same border. You can also choose to play a sound when you pin a window and ignore certain apps from being pinned.

If you would like to make use of this tool, all you need to have more than one window open. Choose a window you would like to always remain active and then tap the shortcut in order to bring up Always on Top. With this, whenever you choose other windows on the screen, you will see that the pinned window will remain the active one. If you would like to unpin the window, touch the activation shortcut once more.

## Awake: Keep Your PC from Falling Asleep

Make use of the awake tool to more easily ensure your computer is awake without you having to deal with the Power & sleep settings in Windows. This can be of immense use when you are executing some type of automated task and you do not want your PC to sleep.

- Choose **the Awake tab in PowerToys Settings**, and ensure that **Enable Awake is switched on**. Choose the Mode dropdown menu to choose any of the three options below;
- Keep using the selected power plan.
- Keep awake indefinitely
- Keep awake temporarily

If you choose to ensure your PC is awake indefinitely, you will be asked to set just how long you are expecting it to stay awake. You also can choose to keep the screen on. When Awake is enabled, you will be able to see an icon for it in the Windows system tray. Right-click that icon to change between the three modes. Based on the mode you decide to choose, your PC will keep on being awake.

## Color Picker: Capture On-Screen Colors

Those involved in any type of graphic work or web design may need to design or recreate a particular type of color. In certain cases, you may detect just the right color on your screen and wish to get it used elsewhere. You can get this done with ease thanks to Color Picker.

- In the PowerToys Settings, choose **Color Picker** to alter the default keyboard shortcut (Win + Shift + C) which will help to get this feature activated. You can also make use of the Activation behavior dropdown menu to pick the behavior of the tool when it is activated.

You are also able to choose the default color format and choose to show the name of the hue. Move down more to choose the specific color format you would like Color Picker to show, e.g., HEX, RGB, CMYK. Etc.

If you would like to make use of the Color Picker, locate a color on a website, image, app or anywhere you choose that you would like to recreate. Tap the designated shortcut to activate the Color Picker and then hover your mouse over the hue until its value is displayed. Choose the Color and the whole tool will then be opened to continue to show the values for that same color in all of the formats you choose.

## FancyZones: Create Custom Desktop Layouts

In Windows 11, you already are able to place windows in varying areas of the screen and make use of Snap Layouts for the purpose of multitasking, but it can still be quite a task to tweak them in just the right way or the way you would prefer. The FancyZones tool can be of help in configuring a certain screen layout before time in order to ensure things are quite easier. All you need to get done is to pop windows into predefined places. Choose the FancyZones tab in PowerToys Settings and choose Launch Layout Editor to configure your zones. Choose one of the default templates, like columns, rows, or grids. You can then include or remove zones as you deem fit. As an alternative, choose Custom to build a layout from scratch. When you are done, choose Apply. Some other configurations you can alter include the activation shortcut, how the tool works with various displays, and how your zones will look and act. Whenever you want to make use of the feature, make use of the activation shortcut, then plop the windows into the zones you must have created.

## File LockSmith: See Which Processes Are Locking a File

Have you ever attempted to delete, move or alter a file just for Windows to inform you that the file is either locked or open? That can be quite frustrating especially when you do not know which application or process is keeping the file in use. With the use of the File LockSmith tool, you can solve that mystery anytime it shows. There are no configurations to customize for this tool, but you ought to open the File LockSmith screen in PowerToys Settings in order to be sure it is well enabled if you would like to make use of the feature. When next a certain file seems as though it is locked, open File Explorer, right-click on the file, and then choose what is using this file? Option from the popup menu.  A File LockSmith window will be shown with the name of the file and the application that is keeping the file open at the moment. You can then choose to select the down arrow close to the End Task button to have a view of more details; like process ID, the name of the person making use of the file, and the path to the file. Select the End Task button to ensure the file and its associated application are closed. If this is a file with content that can be edited like a Word document, just be sure you have stored any alterations before you follow through.

## File Explorer Add-Ons: View More File Formats

Beforehand, File Explorer can show previews of images, audio, videos, and Microsoft Office files, but File Explorer add-ons in PowerToy will also enable you to see Scalable Vector Graphics (.SVG) image files and Markdown (.MD) files. It also has the potential to enhance your ability to see PDF files by allowing you to preview up to the first 10 pages.

- Open **File Explorer add-ons in PowerToys Settings** and turn on any file type that you would like to see. With this tool enabled, open **File Explorer**, choose the **View heading, and then choose the Preview pane**. Then choose your .SVG or.MD files in order to view it in the preview pane, or you can also decide to choose a PDF to get the first 10 pages viewed.

## Image Resizer: Easily Resize Photos

At certain times, a picture or graphic might be too large to be shared via email. You can choose to alter the size via a specified image editor, but the PowerToys Image Resizer tool is more convenient. At the PowerToys Image Resizer tool are more existing preset image sizes.

- You can also choose t**he Add New Size button** to design new presets from scratch.

**Now, when you would like to alter the size of an image,**

- Right-click the file in **File Explorer** and choose the **Resize picture command**. You can then select the size you would like to make use of like Small, Medium, Large, or Phone, or devise your own personalized fit and choose the **Resize button in order to make a new, smaller image.**

## Keyboard Manager: Remap Keys and Shortcuts

Each of the keys on your keyboard does a certain function, but what if there is something else you would like your key to do? You are free to use a special program from a third party to remap your keyboard,

- Or you can also choose to open **PowerToys Settings and choose the Keyboard Manager tab.**
- If you would like to alter the function of a key, choose **remap a key.** In the Physical Key aspect, choose **the + sign** and then you either choose to **press the key you would like to alter or choose it from the dropdown menu**. In the Mapped to part, type or choose the key you would like to get activated when you tap the first key.

Select **OK**, and your key will be remapped to its new functionality. Be careful when you are assigning individual keys due to the fact that they may have certain functions in Windows or its applications. With the use of Keyboard Manager, you can also assign keyboard shortcuts if you choose remap a shortcut.

- Select the **+ sign**, then tap the **shortcut you would like to use**. In the Mapped to aspect, insert or choose the action you would like that keyboard shortcut to activate. Choose **OK** and then tap the shortcut you remapped.

You can also choose to delete a key or shortcut whenever you like by opening the Keyboard Manager Settings window and choosing the trash icon close to the item you would like to remove.

## Mouse Utilities: Find Your Mouse Cursor Faster

Have you ever happened to lose track of the cursor of your mouse? This can happen anytime especially if the cursor is quite small or is one that bends in too easily with the background. The Mouse Utilities tool can aid the location of a missing cursor via three varying options.

- Open **Mouse utilities in PowerToys**, and then make use of the Activation method drop-down menu to configure if the feature switches on after choosing the left Control button twice or having to shake the

mouse. Upon activation, a radar-like circle will point you to the cursor so that you will be able to locate it with ease.

- Switch on **Enable Mouse Highlighter** to display a yellow dot anytime you choose the mouse. You can also enable Mouse Pointer Crosshairs, which will display a crosshair over your mouse cursor when you make use of the keyboard shortcut. All of these three functions can also be personalized to alter appearance and behavior to your preference.

## Customizing keyboard Shortcuts

The shortcut key combination to access the shortcut guide is Win+Shift+ (or, as we like to imagine, Win+?) Simply keep pressing the Win key for the duration specified in the Settings.

**The Windows key-based keyboard shortcuts will be displayed in an overlay, including:**

- common Windows shortcuts
- shortcuts for altering the position of the active window
- taskbar shortcuts

While the guide is shown, you can use keyboard shortcuts by pressing the Windows key (Win). The guide will show the outcome of certain actions (moving the current window, altering the behavior of arrow shortcuts, etc.).

The overlay can be turned off by pressing the shortcut key combination once more. The Windows Start menu can be accessed by tapping the Windows key. The PowerToys application must be running and Shortcut Guide ought to be enabled in the PowerToys settings for this feature to be made use of.

**These configurations can be modified from the PowerToys Settings;**

| **Setting** | **Description** |
|---|---|
| Activation method | Choose your own shortcut or make use of the Win key. |
| Activation shortcut | The custom shortcut used in the launching of the shortcut guide. |
| Press duration | Time (in milliseconds) to hold down the Win. key in order to have the global Windows shortcuts or taskbar icon shortcuts. |
| App theme | Light, dark, or Windows theme. |

| | |
|---|---|
| Opacity of background | Opacity of the Shortcut Guide overlay |
| Excluded applications | Ignore the Shortcut Guide when any of these applications are in focus. Add the name, or part of the name, one per line of an application; the notepad will then match both Notepads. Exe and Notepad++ .exe so it matches only Notepad .exe add the. exe extension. |

## Boosting Efficiency with FancyZone and Run Launcher

FancyZones is a window organizer tool that helps you organize and snap windows into effective layouts to speed up your workflow. To utilize Windows' targets on your desktop, you can establish a collection of zone locations. A window gets enlarged and positioned to fit a zone when you drag it into it or use the corresponding keyboard shortcut.

- **Snapping to a single zone with the mouse**: Move the window. By default, there will also be a need for you to choose and hold the shift key. You will see the zones display. As you drag your mouse, hovering over a zone will highlight that particular zone. You can also choose to trigger zone selection mode by making use of the non-primary mouse button if “Use the non-primary mouse button to toggle zone activation” has been chosen. If both the Hold Shift keys to activate zones while dragging and Use non-primary mouse button to toggle zone activation have been cleared, the zones will be displayed immediately once you commence moving the window.
- **Snapping to a single zone with the keyboard**: Choose Override Windows Snap in the FancyZones configurations. Use Win + arrow keys for the snapping of a window to a zone. Move windows based on to select if to move windows depending on the zone index or the relative position of the window.
- **Snapping to multiple zones: A window can be snapped to more than one zone with the method below;**
    - Snapping to two zones by hovering the edges: If two zones are adjacent, you can choose to snap a window to the sum of their area (rounded to the minimum rectangle that has both). When the cursor of the mouse is close to the common edge of both zones, the two zones will then be activated simultaneously, enabling you to drop the window into the two zones.

- Snapping to multiple zones with the mouse and keyboard: Move the window until one of the zones becomes activated, then tap and hold the Ctrl key while moving the window to choose more than one zone.
- Window switching: When two or more windows are snapped in the same zone, you can choose to cycle between the snapped windows in that zone by making use of the shortcut Win + PgUp/PgDn.

## Using the editor

FancyZones has an editor that offers more control over the layouts of your window that can be accessed in the PowerToy Settings. By choosing Launch layout editor or pressing Win+Shift+' ("back-tick" or "accent grave"), you can access the layout editor. In the PowerToys Settings, you can modify the shortcut for the FancyZones layout editor. When you first open the layout editor, a list of layouts that can be altered will be shown by the number of windows on the monitor. Choosing a layout displays a preview of that layout on the screen. The chosen layout is added instantly. Clicking twice on a layout will add it and have the editor closed. The editor will then detect and show the available monitors. Choose a monitor and it will become the target of the chosen layout. Choose + create a new layout at the bottom. There are two styles of custom zone layouts; Grid and Canvas.

The Grid model starts with a three-column grid and enables the creation of zones by splitting and merging them, as well as by adjusting the gutter spacing between them. Because of the relative nature of the layout, it will adjust to different screen sizes. Both a mouse and a keyboard can be used to change the layout. The Canvas concept allows for the addition of additional zones that may be moved and scaled, much like windows, and it starts with one zone. The canvas model's zones might overlap. Zone editing in canvas layout is also supported using the keyboard. To move a zone 10 pixels, press Left, Right, Up, or Down on your keyboard. Press Ctrl+arrow to move a zone one pixel. To resize a zone by 10 pixels (5 per edge), press Shift + arrows. Press Ctrl + Shift + arrows to resize a zone by 2 pixels (1 per edge). Press Ctrl+Tab to switch between the editor and dialog.

## Run Launcher

One of the utilities within PowerToys is the Run Launcher which enables you to swiftly open applications, open files, or execute commands by touching a hotkey and inserting the name of the program or file you would like to open. You can quickly open applications installed on your system by simply typing

the name of the application you would like to open and then tapping the Enter key. This is of great use for those who would not like to make use of the Start menu or desktop shortcuts. With the use of the Run Launcher, you can open files and documents by typing just their names. You are also able to execute system commands and utilities just from the Run Launcher by typing the name or path of the command. It can be used to perform tasks like shutting down or restarting the computer.

You can also use the Run Launcher to perform web searches. Just type a query and indicate a search engine. This can help you get to your preferred search engine without having to open a web browser.

**Below are steps to making use of the Run Launcher;**

- Right-click on the **PowerToys icon** and choose Settings.
- In the PowerToys Settings window, choose **Run in the left sidebar**. Toggle the **switch** to get the Run Launcher enabled.
- By default, the hotkey to open the **Run Launcher is Alt + Space**. You can alter this hotkey if need be. To get this done, choose the **Customize option** close to Hotkey in the Run settings and indicate your preferred key combination.
- With the Run Launcher enabled, tap t**he hotkey you configured**. A text input box will then be displayed on your screen.
- Insert the name of the application, file, or command you would like to execute. The Run Launcher will show matching results as you are typing, ensuring it is quite easy to choose the correct one.
- Once you can see the preferred item in the search results, you can either choose it with your mouse or tap **“Enter”** to run the command.

The PowerToys Run Launcher is a very easy way to swiftly gain access and run programs or run commands on your Windows system without having a need to move through the Start menu or File Explorer. It's especially of great use for power users who would like to streamline their workflow while saving time.

# Activity

1. What are PowerToys Utilities?
2. How can you boost your efficiency with the use of FancyZones and Run Launcher?

# CHAPTER 37
# MANAGING USER ACCOUNTS AND FAMILY SAFETY

A secure and controlled computing environment, security, and privacy are the main reasons why managing user accounts and family safety settings is crucial.

**The following are some prerequisites to managing user accounts and putting in place family safety measures:**

- Strong password protection and two-factor authentication for user accounts aid in preventing unauthorized access to sensitive information and resources. Managing accounts ensures that only people with the proper authorization can use a system or service.
- User account management enables users to manage and safeguard their online activity and personal data. People can also pick what information they want to share with others and change their privacy settings.
- Administrators can give the right permissions and access levels to specific people or groups by managing user accounts. This lessens the chance of data breaches and misuse by ensuring that users can only access the resources and data required for their tasks.
- For parents and guardians to shield kids and young users from improper content and potentially hazardous online interactions, family safety measures are essential. By limiting children's access to websites, apps, and material, managing family safety settings contributes to the creation of a secure online environment for children.
- User account management is essential for compliance with data protection and privacy rules in regulated businesses and organizations. Additionally, it guarantees responsibility for users' actions and activities within a system or organization.
- The prevention of unwanted access to systems, applications, and data is made easier by effective user account management. For sensitive information to remain confidential and intact, this is crucial.
- By connecting specific acts and activities with unique people, individual user accounts encourage accountability. This is crucial for auditing and inquiries in both private and public settings.

## User Account Control (UAC) Customization

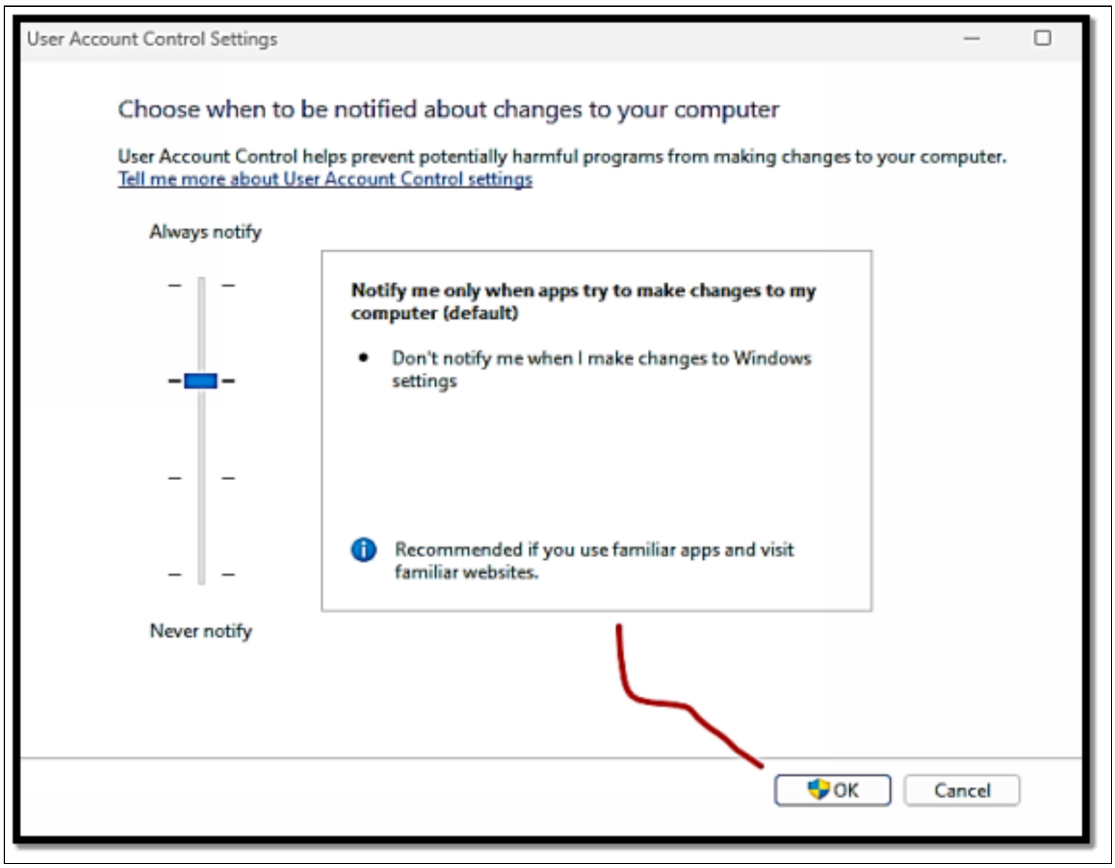
The Windows Operating System's User Account Control (UAC) security feature was created to lessen the effects of malware. Every user has at some point activated a UAC prompt. Attempting to install an application or modify a setting that needs administrator rights are examples of actions that could result in a UAC prompt. The pop-up that asks the user to confirm that they actually want the installation or other change to happen is known as a UAC prompt. In order to address the security issues of Windows XP, Windows Vista added the UAC prompt. Except for some graphic updates in Windows 11, the UAC prompt hasn't changed much since then. In Windows, an access token is given to each new application. The access and privileges for the application are specified by this token. Giving local administrators two tokens —one normal token and one admin token—is the basic idea underlying Windows UAC. Only a regular token is released at first. However, by default, a UAC prompt message appears when an application specifically demands an admin token. An admin token is given out if the user chooses to move on with the execution of their request by selecting "yes" on the UAC prompt. The program can then operate with a lot of privileges thanks to the admin token.

An admin token gives the program access to virtually everything on the system, similar to an "access all areas" pass. Therefore, if an application that uses an admin token is compromised, an attacker can cause serious harm. The UAC step's inclusion reduces the number of applications using admin tokens that an attacker can take advantage of. The chance of an attacker obtaining an admin token without causing a notice to the user for permission is also decreased by user account control. Users aren't inundated with pop-up ads because the majority of applications don't require an admin token to operate. Thus, it appears that we have a reliable security measure in place. But hold on—the narrative isn't over yet. If you enter your system folders manually or you have a need to fire up the Editor and commence making loose and fancy registry keys, UAC will understand what you are doing and let you be. The minute a program attempts to do those kinds of things, Windows will issue a warning that a potentially dangerous program is on the prowl and offer you a chance to get the program killed in its tracks.

**Windows enables you to modify the User Account Control hence it is not such a dramatic feature. If you would like to modify the UAC level of your computer, follow the steps below;**

- Choose or touch **the search icon and type uac**. At the top of the ensuing list, select **Change User Account Control Configurations**.
- Modify the slider if need be, and then choose or touch **OK**. If you are making use of a standard account, there is a need for you to give an administrator username and password (or PIN) in order to execute the

change. If you are making use of an administrator account, you ought to confirm the changes made.




- Choose or touch **Yes**. Once this has been done, the changes will take effect immediately.

| **Slider** | **What It Means** | **Recommendations** |
|---|---|---|
| Level 1 (top) | When a program attempts to install software or make changes to the computer that require an administrator account, or when you attempt to alter Windows settings that require an administrator account, the complete UAC message is displayed. Even if you have an administrator account, you will see these notifications. The screen goes black, and you are unable to do anything | This level provides the highest security but also the highest hassle factor. |

| | | |
|---|---|---|
| | until the UAC screen is responded.<br><br>Whenever a program wants to install software, make changes to the computer that needs an administrator account, or try to update Windows settings that need an administrator account, it always displays the full UAC notification. Even if you are logged in with an administrator account, you still see these notifications. You are powerless until the UAC screen is responded to when the screen goes dark. | |
| Level 2 | When a program tries to make modifications to your computer, it displays the UAC message, but typically not when you make changes yourself. | The default and maybe the best choice. |
| Level 3 | The level is just the same as level 2 with the exception of the fact the UAC notification does not lock and dim your desktop | Potentially problematic. Dimming and locking the screen presents a high hurdle for malware. |
| Level 4 | UAC is disabled, so programs can install other programs or alter Windows settings, and you can change anything you want without being prompted by UAC. It should be noted that this does not override any other security settings. For example, even if you use a regular account, you must still supply an administrator's ID and password before installing software that runs for all users. | Automatically switches off all UAC warnings - NOT recommended. |

UAC-level regulations are evaluated based on a unique Windows security certificate. Programs that have that certificate are considered to be part of Windows. Programs that are not signed with that exact certificate operate

outside of Windows and, as a result, elicit UAC prompts if your machine is set to Level 1, 2, or 3.

## Family Safety Features and Parental Controls

Windows 11 contains a number of Family Safety features that are intended to assist parents and guardians in creating a safer and more controlled online environment for their children. You can use these capabilities to monitor and manage your child's digital activity, establish use limits, and block access to problematic content.

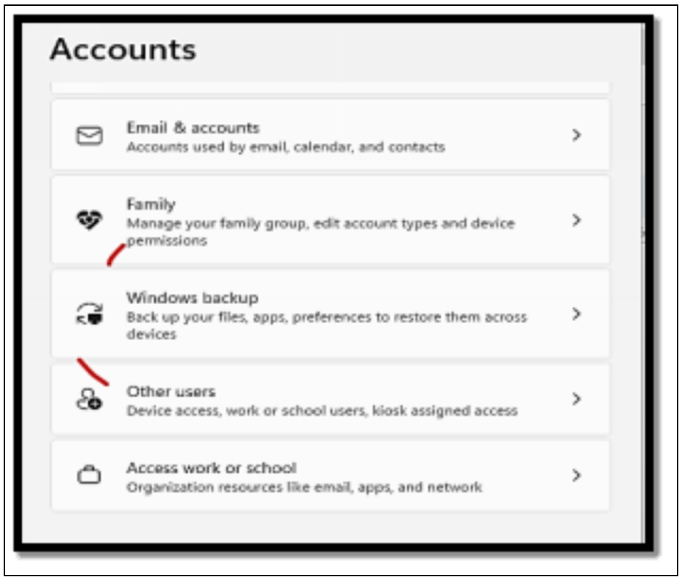
**Here are a few of the Family Safety features in Windows 11:**

- **Microsoft Family Group:** This is a service that enables the creation of a family group and includes your children as family members. This allows you to manage their experiences online and also gain access to Family Safety settings.
- **Activity Reporting**: Windows 11 offers activity reports that provide you with insights into your child's online activities which include websites they have visited, applications and games they have downloaded, and the amount of screen time they have had.
- **App and Game Restrictions**: You can choose to block or enable certain applications and games depending on age-appropriate ratings. This feature helps to ensure that your child will have access to content that is suitable for their age alone.
- **Web Browsing Restrictions**: Family safety enables you to configure web browsing restrictions so as to block or enable certain websites. You can also choose to configure strict or moderate web filtering to reduce exposure to inappropriate content.
- **Screen Time Limits**: You are at liberty to configure daily screen limits for the device usage of your child. Upon the completion of your allotted time, the device will lock, and your children will then need your permission to proceed with using it.
- **Content Filters**: Family Safety offers content filters for various search engines like Bing and content applications like Microsoft Edge. This aids the prevention of your child from stumbling upon appropriate content while an online search is ongoing.
- **Microsoft Store Restrictions**: You can gain control of what your child can download and purchase from the Microsoft Store. This includes configuring age restrictions and having a need for your approval for downloading applications and purchases.

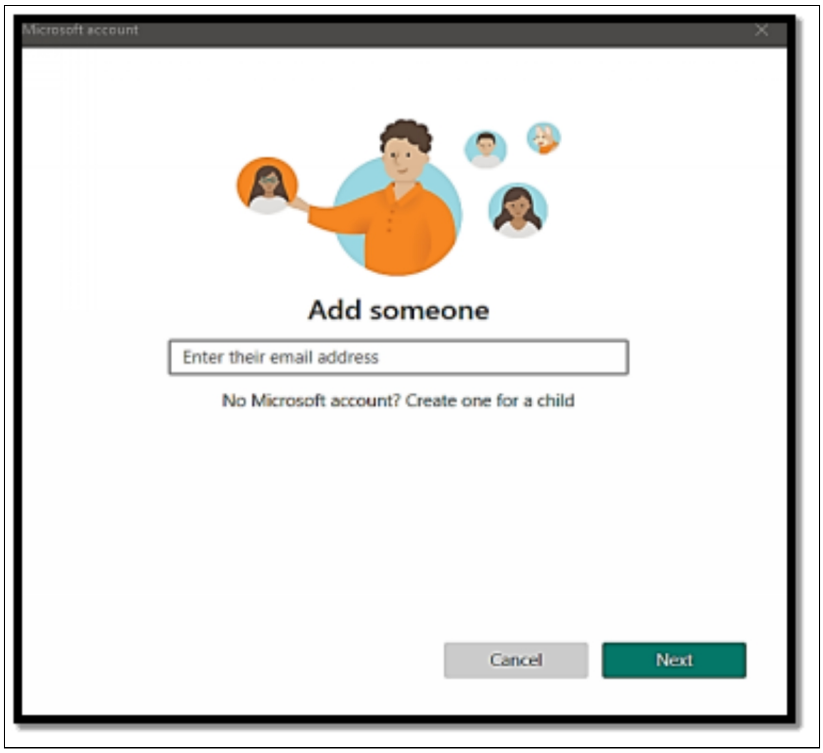
Microsoft provides a somewhat robust set of parental controls in Windows 11 that you may use to monitor your child's computer activity. You can use the

built-in parental controls to prevent your children from visiting harmful websites, set screen time limits, examine activity reports to see how and when your child is using the computer, and monitor app and game purchases. To use the parental controls, your child must log into Windows 11 with the account you created for them. The child will have full access to Windows 11 if you leave your account logged in. When the child signs into their account, the controls will automatically limit their access to the internet, apps, and the amount of screen time they're permitted to spend based on their age. You can also tailor all of these settings to your preferences. If you would like to configure parental controls in Windows 11, you and your child will both have a need to own a Microsoft account. Your own account will be a parent account and theirs will be a child account that is attached to yours. As the parent account holder, you can switch on parental controls and see reports that are in sync with the activity of your child. **Below is how to configure parental controls in Windows 11;**

- Right-click the **Windows icon on the taskbar**.
- Choose **Settings**.
- Choose **Accounts**.
- Choose **Family**




- Select **Add account.**
- Choose C**reate one for a child.**




- Insert **an email address for your child then choose Next.** If you are not logged into your Microsoft account, there is a need for you to do that first. Parental controls are not available if you do not own a Microsoft account.
- Insert a password and then choose Next.
- Insert **a name and choose Next.**
- Insert **a birthday and choose Next**. Windows 11 will be able to make use of the birthday you insert and generate automatic restrictions depending on the age.
- The account of the child will now be linked with your own Microsoft account, and a message will then be displayed to show that the process has been completed.

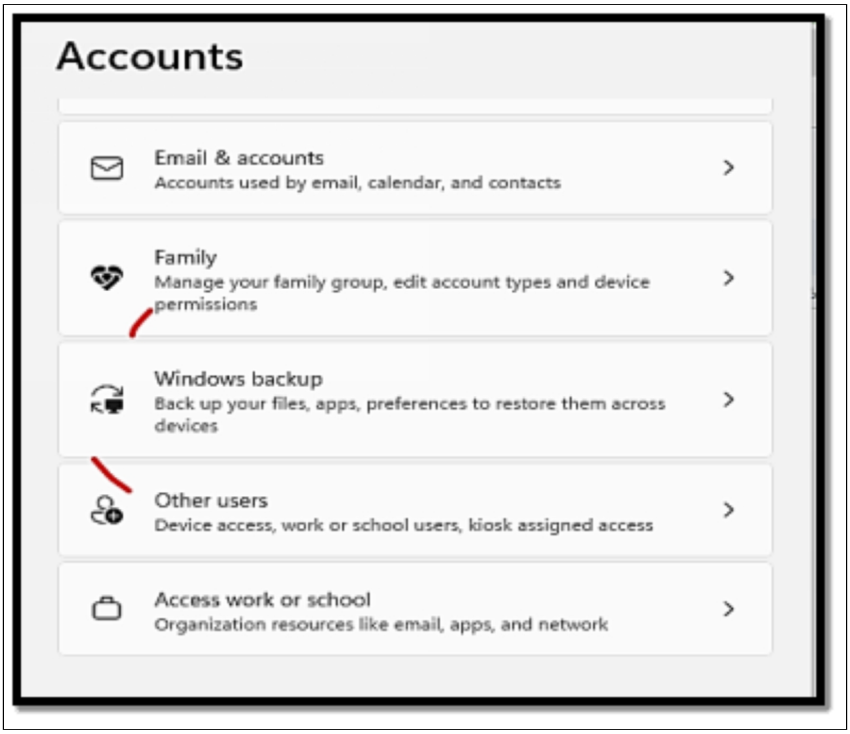
## How to Use Parental Controls in Windows 11 to Block Websites and More

Once you have been able to configure at least one child account, you can then limit their access to websites and applications, limit screen time, and get weekly reports as regards their activities. If you have numerous children, you can create a single account for them to share, or you can create multiple accounts and adjust the parental controls and screen time limitations for each child. Even though the example only contains a single child account, if you

create many child accounts, you will be able to access the settings for each account using the technique outlined below.

**Follow the steps below to make use of the parental controls in Windows 11;**

- Locate **Settings > Accounts > Family l**ike you have done in the previous section.




- Choose **Manage Family Settings Online or remove an account.**
- In the Your Family section, choose **your child's account icon.**
- This is the Windows 11 parental control settings page, Here you are able to see an overview of your settings. Choose **Screen time** to configure screen time limits for your child.
- This is the management page of the screen time of Windows 11. Select **Turn limits for a certain device**, or choose the Use one schedule on all devices toggle to configure universal screen time limits.
- Choose **a day to configure screen time limits**.
- Configure the preferred screen time limits and the hours your child ought to be able to make use of the computer and select **Done**.
- Select **Content filters** to reduce the access your child has to websites and applications.
- This is the management page for content filters. Choose the **Filter inappropriate websites and searches toggle** if it hasn't been chosen

already. To enable access to certain websites, choose the only use allowed websites option.

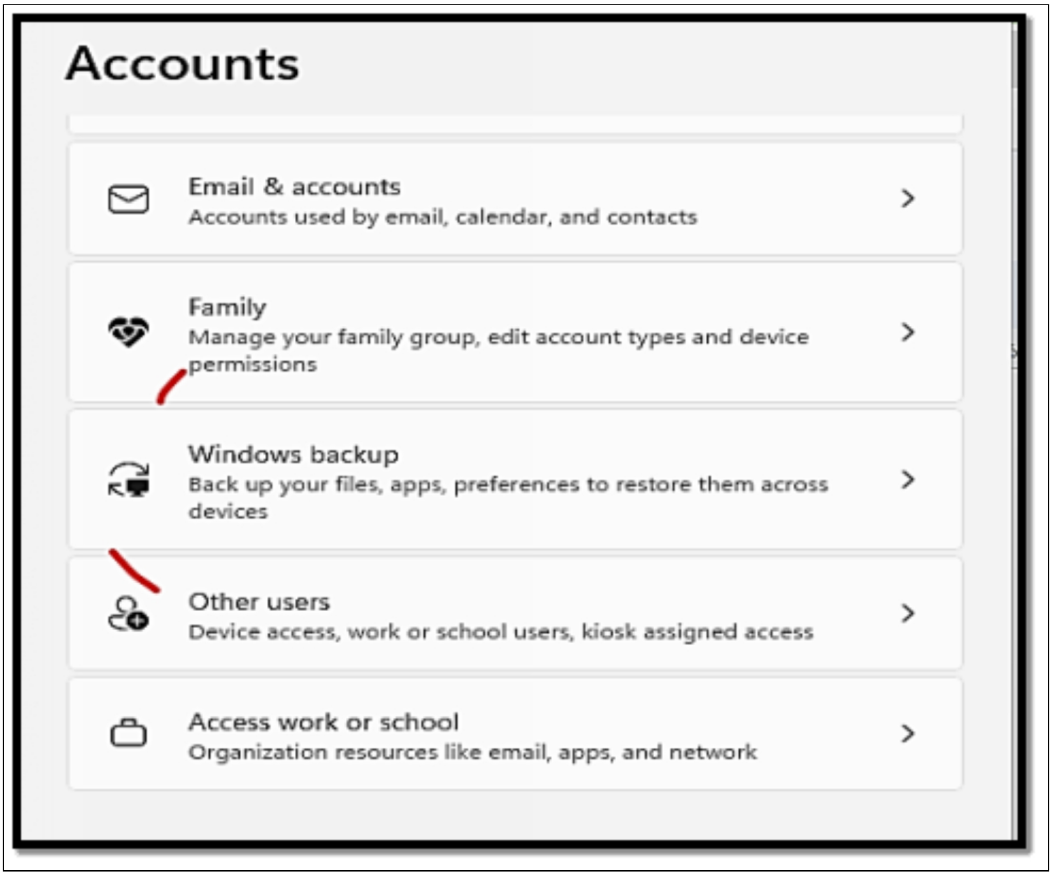
- Choose **Add a website** to add a website to grant access to a certain site.
- Type **the address of a website and choose +.**
- You can also manage access to applications in this place. Move up and choose Apps and games.
- Choose **the applications and games** that are rated up to the age menu and choose an age limit to enable your child to gain access to appropriate applications.
- If there is a need for your child to make use of a certain application, you will get a notification as regards that. Approve the application, and it will be displayed in the allowed apps section of the page. You can also choose to enable and block certain applications. To enable an app that has been blocked automatically, choose Remove.
- You can also choose to configure spending limits for your child or prevent them from buying applications. Choose **Spending.**
- In this last stage you will be at the spending settings page. Ensure both toggles are switched on if you would like to approve any purchase in the Microsoft Store and if you would like to get an email any time your child downloads or buys an application or game. If you will be giving them some funds to spend, choose Add Money and deposit some funds to their Microsoft Store Wallet.

## Setting up Child Accounts

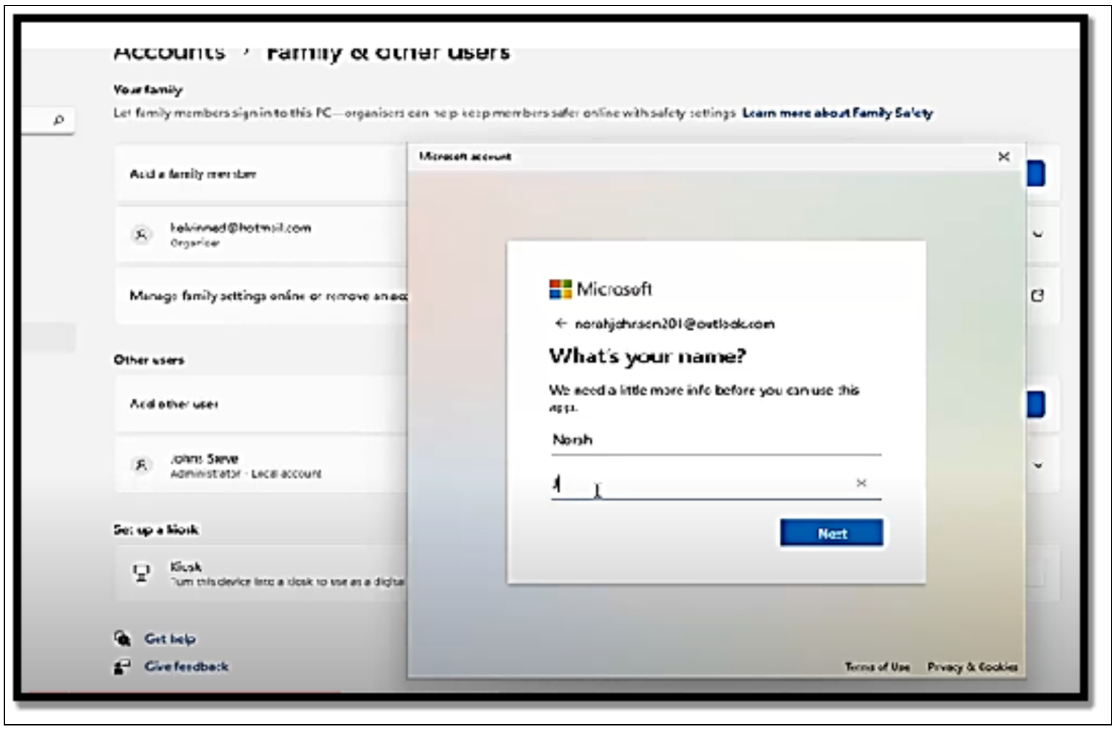
For a long time, Windows has allowed you to create separate accounts for numerous users, which is a terrific approach to ensure family members may use the same computer without risking data loss. Each user has their own place, so everyone feels as though they have their own computer. In Windows 11 (and Windows 10), you can also establish a child account to allow your children to use your computer while keeping them secure and monitoring their activity. On Windows 11, child accounts are linked to the Microsoft Family app, making them more than just a separate user account. You may control their Microsoft account settings, such as spending limits, screen time limits, and site filters. This also implies that you must have your own Microsoft account in order to create a child account for someone else. By default, you should be logged in to yours. With that in mind, let's get into creating and managing a kid account.

**Configuring a child account in Windows 11 can take a lot of time, but it is not a very difficult process. Below are the things you have to do;**

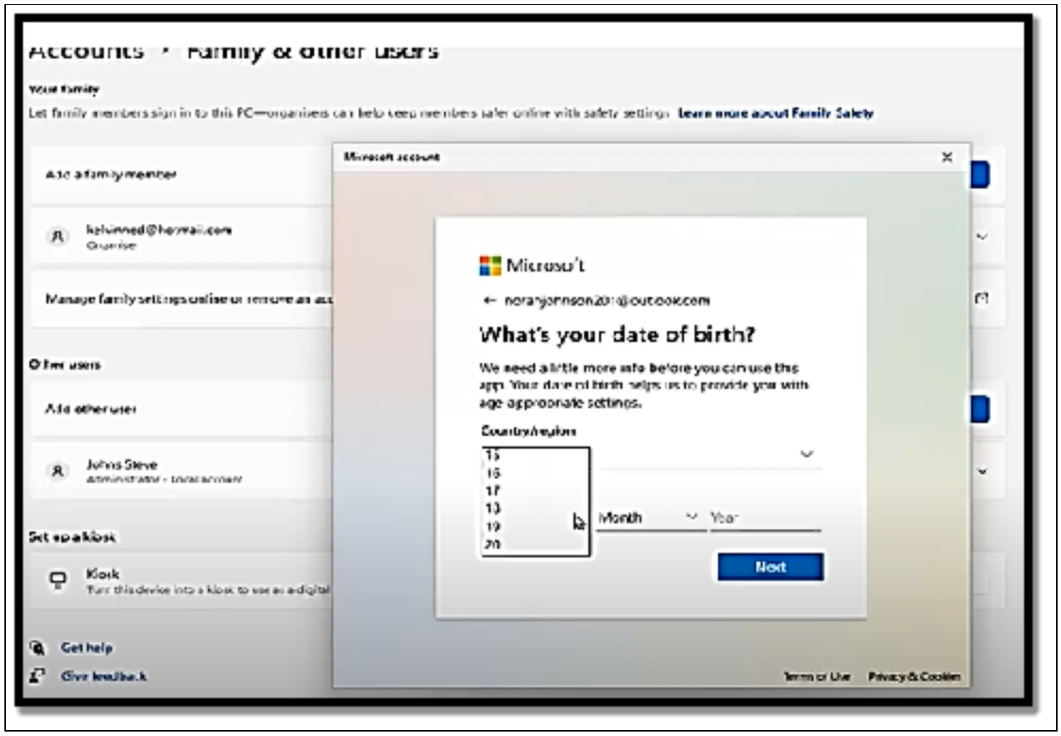
- Open the **Settings app on your PC.**
- Choose the **Accounts section** from the menu on the left side.
- Choose **Family**.




- Choose **Add someone.**
- You will be prompted to enter an email address if your child has one, or you can design a new one, which is what will be done here.
- In order **to create an email address, commence by entering the child's first and last name.**




- Insert **your country and the birth date of your child**.




- For much younger children, you will then have to sign into the account you have just created with the use of their email and password.

- Confirm **that you are the parent of the child or legal guardian and choose Continue**.
- Sign in to **your Microsoft account** and confirm that you consent to the account by choosing **Yes I agree**.
- Confirm if you would like your child to be able to sign into non-Microsoft apps, and then choose **Continue.**
- Finally, confirm the configurations you would like for the account of the child. You can design screen time limits, configure age restrictions for applications, and enable features such as activity reporting and web filters.
- Choose **Sign out** in order to close the Window and save your configurations.

**After you've created the account, you'll need to sign into your child's account on the PC to complete the setup. To access the lock screen,**

- Hit the **Windows key + L on your keyboard**, and your child's account will be on the left side. Select it to sign in and configure it. This will be similar to the first time you set up your own account, but simplified. To sign in, for example, you can use a PIN or Windows Hello.

# Activity

1. What are Family safety features?
2. Why is parental control needed?
3. Set up an account for a child.

# CHAPTER 38
# ADVANCED FILE SHARING AND PERMISSIONS

Advanced file sharing and rights management are critical for managing access to files and folders on a computer or network, especially in commercial or corporate contexts. These advanced features allow you to fine-tune access restrictions, ensuring that only authorized users can read, change, or delete specific files and directories. Individual users or groups can be given permission. Group permissions are very valuable since they allow you to grant or prohibit access to several users at the same time. Users can belong to several groups, each with its own set of rights. When various rights are imposed through group memberships or inheritance, determining a user's effective permissions can get complicated. Advanced systems enable you to compute and display a user's effective permissions in order to determine exactly what activities they can execute on a resource. Effective permission management frequently entails successfully building and utilizing groups. Instead of assigning permissions to individual users, allocate them to groups, which simplifies management as individuals come and go. Advanced file sharing and permission management are essential for ensuring data security, confidentiality, and integrity in both personal and business computer contexts. It enables you to strike a balance between providing necessary access to users and protecting sensitive information from illegal access or alterations.

## Shared Folders and Advanced Sharing Options

The "Network Discovery and File Sharing" option in Windows 11 must first be enabled in order to share files and folders with other computers or devices connected to the same network. The computer can view other computers and devices on the same network by enabling the "Network Discovery" feature. It also enables the computer to be seen by other devices connected to the same

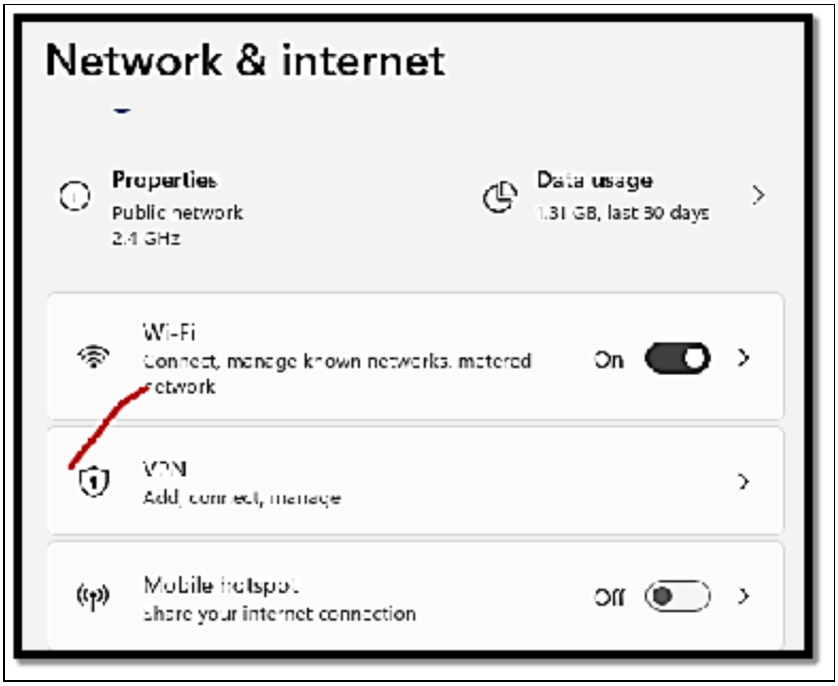
network. The "File and Printer Sharing" setting must be enabled in order for other computers or devices to use the shared files, folders, or printers from this specific computer. **In the steps below, you will learn how to switch on network discovery and share files in Windows 11.**

- Tap the **Windows + I keys** at the same time in order to open the settings application.
- Choose the Network & Internet aspect and choose **Ethernet**. Once done, choose the Change advanced sharing options.
- Beneath **the Network profile type aspect**, you can choose **public or private**.
    - If you decide to select private, this profile will enable the discovery of devices in your network. If there is a need for you to share files or make use of applications that communicate over this network, you should also choose this profile.
    - If you have some other networks like Wi-Fi (if you are connected to a wireless network) or Ethernet (if you happen to be making use of a network cable to connect to the network), you can also configure the profile type to public.

## File Sharing

**In this aspect, you will learn how to turn file sharing on in Windows 11;**

- Locate **Settings > Network & Internet**. If you are making use of a Wi-Fi network connection, there is a need for you to choose **Wi-Fi**. While, if you are making use of a network cable, all you need is to choose Ethernet.




- Choose the **Change advanced sharing options link beneath related settings**.
- Switch **on file sharing**.
    - Beneath Private (current profile), check **Turn on network discovery and also check Turn on automatic setup of network connected devices.**
    - Expand Private (Current profile). Check **Turn on file and printer sharing beneath File and printer sharing.**
    - Move down and expand All Networks. Check **Turn on sharing so that everyone with access to the network will be able to read and write files in the Public folders beneath Public folder sharing.**
- Choose the **Save Changes button**.

## Managing NTFS Permissions

You can modify the sharing permissions for drives and folders in any Windows network. Each user on that network has the option of sharing entire drives or specific folders with the network. Drives formatted with the NTFS file system can access NTFS (NT File System) rights. The benefit of NTFS permissions is that they apply to both local and network users, regardless of where the user is

connecting, and are based on the permissions provided to each individual user at the Windows logon. The default file system for Windows NT and all subsequent versions of the Windows operating system is called NTFS. Wide-ranging modifications were made in Windows 2000 and before, including the ability to manage inherited permissions and the way that permissions were set up to share files and folders. To give network users access to file resources, you use shared folders. As a form of system security, administrators can use the NTFS tool to grant access control for files and directories, containers, and other networked objects. This data, referred to as the "Security Descriptor," regulates the type of access that is permitted for both individual users and groups of users.

The increased flexibility that NTFS offers comes with the possibility of complex setups, which can cause issues for administrators. It might be challenging to solve a permission issue when it arises if you don't have a good understanding of the various permissions and their interactions. The most common way to configure permissions is to make use of Windows Explorer.

**To configure permissions for an object;**

- In Windows Explorer, right-click **a file, folder, or volume and select Properties from the context menu**. The Properties dialog box will be displayed.
- Choose the **Security tab.**
- Beneath **Group or user names**, choose or include **a group or user.**
- At the lower part, enable or deny one of the permissions available.

# Access Control List (ACLs) Explained

An access control list is a list of guidelines used to provide various levels of access to files and important business data or assign rights. Access control lists (ACLs) can be used by organizations to secure data. To prevent unauthorized users from accessing confidential corporate information, access control lists are frequently used. By restricting user access to systems, files, and data, it can also be

used to manage network traffic. This improves network efficiency and contributes to the protection of corporate data.

**Below are some of the advantages of making use of ACL;**

- It helps to enhance network performance by reducing network traffic.
- Offer security by defining permission and access to rights.
- Provides granular control over the traffic flow going into the network.

**In making a comprehensive definition of an ACL entry, there is a need for you to have access to very important information that is also known as the components of the ACL which includes;**

- **Sequence number**: A sequence number can be explained as the code to indicate an ACL entry.
- **ACL name**: As against making use of a sequence number, you can also make use of an ACL name to indicate ACL entry. Lost routers enable you to design names with a combination of letters and numbers.
- **Remark**: Certain routers enable the addition of comments or detailed descriptions into an ACL known as remarks.
- **Network protocol**: You are at liberty to grant permission or even deny access to various network protocols like IP, TCP, UDP, IPX, and more depending on access control rules or protocol-specific parameters.
- **Log**: Logging-enabled access control lists offer in-depth insights into incoming and outgoing network traffic.
- **Statement**: You can include permit or get to deny statements and configure them as default. These statements can be seen when a certain source is denied or granted depending on the address.
- Source or destination: It is quite important to state the source or destination of an IP to determine its permission and access rights depending on certain ACLs.

**There are five different types of access control lists all of which are highlighted below;**

- **Standard ACL**: Standard lists are the most common type of access lists that are used for simple deployments. They enable the filtering of just the source address of the data packet. Although they are less processor-intensive.
- **Extended ACL**: Although extended lists are quite complex in configurations and resource-intensive, they offer a granular level of control. By making use of these lists, you can be more exact while having to filter data packets. You can also choose to evaluate the packets based on various factors like source and destination IP addresses, source, and destination port, and type of protocol (ICMP, TCP, IP, UDP), and more.
- **Dynamic ACL**: Dynamic ACLs are most times known as Lock and Key, and they can be used for certain attributes and timeframes. They depend on extended ACLs, authentication, and Telnet for their functioning.
- **Reflexive ACL**: Reflexive ACLs which also can be called IP session ACLs. They help with the filtering of IP traffic depending on upper-layer session information. These ACLs can only be used to allow IP traffic that is produced within your network and deny the IP traffic produced from an external or anu network that seems unknown.
- **Time-based AC**L: Time-based ACLs are like extended ACLs. Nevertheless, they can be implemented by designing certain times of the day and week.

**Other types of access controls include;**

- **Mandatory access control**: The mandatory stringent concept was created especially for government institutions. Based on a hierarchical paradigm, this rigid and safe model. To access resources, users are given a security label and a clearance level, whereas objects are given a security label. Users can only access the resources that, in accordance with their hierarchy level or security level, are available to them.
- **Discretionary access control:** Since it is frequently necessary to alter the display of the content, discretionary access control can be utilized in social networking. With this architecture, you can choose who has access to your data and

it is flexible. Additionally, it enables you to adjust access rules for any user.

- **Role-based access control**: Role-based access control enables you to provide employees with particular roles in accordance with their responsibilities inside an organization. These jobs also correspond with privileges for access permits. When you need to share data with a particular department, you can utilize this kind of control.
- **Attribute-based access control:** Attribute-based control enables you to set a list of attributes, which includes resources, users, and objects. With the use of this particular model, access is granted to the user depending on its role and attributes.
- **Rule-based access control**: This type of control enables or denies access dependent on a predefined number of rules.

## Activity

1. Share a folder on your device with someone else.
2. Manage your NTFS permissions.
3. What do you understand about Access Control Lists (ACLs)?

# CHAPTER 39
# WINDOWS UPDATE STRATEGIES AND WSUS

Windows Update Strategies frequently take security, ensuring updates are managed across numerous Windows computers, and reducing disruptions in an account. In many businesses' update plans, particularly in corporate and enterprise settings, WSUS (Windows Server Update Services), a Microsoft technology, is essential. To manually review, test, and deliver updates to all systems in many enterprise setups, IT managers use WSUS. This method enables rigorous testing to make sure that updates won't interfere with crucial programs or processes. To get the most recent updates, WSUS can synchronize with Microsoft's update servers. Which updates are synced and made accessible for deployment within the company can be managed by administrators. Administrators can postpone some updates, such as feature updates, for a predetermined time frame using WSUS. This is crucial for enterprises that need additional time to evaluate stability and compatibility. The extensive reporting and monitoring features offered by WSUS enable administrators to keep tabs on the status of update deployment, compliance, and any unsuccessful installations. This information is useful for maintaining security and addressing problems.

In conclusion, WSUS is a useful solution for businesses wishing to efficiently handle Windows updates, especially in large, complicated systems. It enables administrators to exercise fine-grained control over updates, carry out exhaustive testing, and make sure systems are reliable and safe. To be compliant with regulations, the organization's demands, resources, and update plan should all be taken into account.

## Windows Update for Business

**Windows Update for Business is a free service that is available for the following edition of Windows 11;**

- Pro, including Pro for Workstations
- Education

- Enterprise, including Enterprise LTSC, IoT Enterprise, and IoT Enterprise LTSC

Windows Update for business allows IT administrators to keep the Windows client devices in their various organizations always up to date with the latest security defenses and Windows features by a direct connection of these systems to Windows Update Service. You are at liberty to make use of Group Policy or Mobile Device Management (MDM) solutions like Microsoft Intune for the configuration of the Windows Update Business configurations that manage how and when updates are made to various devices. Basically, Windows Updates for Business enables you to manage update offerings and experiences in order to give room for reliability and performance testing on a subset of devices prior to deploying updates across the organization. It also offers a positive update experience for individuals in your organization.

Windows Update for Business allows commercial customers to manage the Windows Updates that are received as well as the experience a device gets when it receives them. You are able to manage Windows Update for Business policies by making use of either Mobile Device Management (MDM) tools like Microsoft Intune or Group Policy management tools like local policy or the Group Policy Management Console (GPMC), and also various other non-Microsoft management tools. MDMDs make use of configuration Service Provider (CSP) policies as against Group Policy. Furthermore, Intune makes use of Cloud policies. Not all policies can be found in all formats (CSP, Group Policy, or Cloud Policy).

## Types of updates managed by Windows Update for Business

**Windows Update for Business offers management policies for various types of updates to Windows 11 devices;**

- **Feature updates**: formerly known as upgrades, feature updates have not just security and quality revisions, but also have important feature additions and alterations. Feature updates are released immediately after they become available. Feature updates are however not found for LTSC devices.

- **Quality updates**: Quality updates are traditional operating system updates, typically released on the second Tuesday of every month although they can also be released at any time of the month. These include security, critical, and driver updates.
- **Driver updates**: Updates for non-Microsoft drivers that are relevant to your devices. Drive updates are usually on by default, but they can make use of Windows Update for Business policies to turn them off if that's your preference.
- **Microsoft product updates**: Updates for other Microsoft products, like versions of Office that are installed with the use of Windows Installer (MSI). Versions of Office that are installed by making use of Click-to-Run cannot be updated with the use of Windows Update for Business. Product updates are usually off by default. You can however choose to turn them on by making use of Windows Update for Business policies.

## Windows Server Update Services (WSUS)

Windows Server Update Services (WSUS) is a Windows server role that is capable of organizing, administering, and distributing updates, patches, and hotfixes for Windows servers, client operating systems (OSes), and other Microsoft applications. It offers a central location for clients to download updates and gives system administrators control over when and how systems install updates. It is intended for usage by small to medium-sized businesses (SMBs). Adding WSUS to a Windows network normally has no added cost. System administrators can manage Microsoft Windows updates by installing WSUS on Microsoft Windows Server. It will be included in Server 2022 and is compatible with Windows Server 2008 R2, 2012, 2012 R2, 2016, and 2019. Windows 8.1, 10, and 11 are all supported by Microsoft client operating systems that can use WSUS.

An enterprise can manage how and when Windows machines receive OS patches and updates by using WSUS. Additionally, it enables automated updating within predetermined bounds. Clients deploy updates without WSUS as soon as they become available from Microsoft. This may result in clients having varying patch levels, customers installing updates that damage software, or clients installing fixes in the midst of the workday, which would result in employee downtime. Additionally, it permits automated updating within

predetermined boundaries. System administrators can use WSUS to apply updates during a maintenance window so that production work is not interrupted and have time to ensure that the upgrades are compatible with their network. An organization might not wish to update the accounting division while filing taxes, for instance. All clients would directly access Microsoft servers to download updates in the absence of WSUS. This could result in excessive internet use and have a negative impact on productivity in networks with lots of clients or limited bandwidth. Since WSUS serves as a central hub, the server only needs to download one update from Microsoft so that all clients may access it. With this strategy, high-speed LAN connections are used more effectively, and overall internet consumption is decreased. Multiple languages are supported by WSUS, and the information for these languages can be made available only in certain contexts. There is no additional server license needed for Windows Server Update Services. A Windows Server Client Access License (CAL) is the only need for clients connecting to WSUS. Because the majority of businesses already buy Windows Server and CALs, WSUS rarely incurs additional expenses for a business.

Windows and Microsoft Office updates are the only products that WSUS supports. It does not permit the addition of new software or the update of existing ones, including Google Chrome. Additionally, it does not support other OSes like Linux or macOS. Microsoft Windows Server Manager is used to install WSUS on Windows Server as a server role. The role is usable as soon as it is activated. .NET, Microsoft Report Viewer, Internet Information Services (IIS), and a database like Windows Internal Database (WID) or SQL are some of the requirements. On Windows Server, all of these prerequisites are provided for free. WSUS can be a single server or a group of servers operating together, depending on the size of the network. The content and configuration updates for WSUS servers can be obtained from one another. This makes it possible to have enormously vast networks and separate servers for each office location. It is not sufficient to just deploy a WSUS server on a network; clients must be set up to connect to it rather than Microsoft Update. System administrators can manually edit registry keys and use System Center Configuration Manager (SCCM), mobile device management (MDM), or Group Policy to configure the client. Administrators have control over how clients install updates, whether they reboot thereafter, and how users are notified of the updates.

The client's activities to install updates are handled by the Windows Update Agent (WUA). It establishes a connection to the WSUS server, looks for required updates, downloads them, and then installs them. Background Intelligent Transfer Service (BITS) is used throughout the download to maximize available bandwidth. A few network ports must be open for WSUS to function. For the server to get the update packages, it must be able to communicate with the Windows update servers on ports 80 and 443. Ports 8530 and 8531 are the default ports used by clients to connect to the WSUS server, however, these can be altered.

## Deferring Updates and Quality vs. Features Updates

When feature and quality updates are first made available on the Windows Update service, a Windows Update for Business administrator has the option to delay their deployment to devices for a limited period of time. This delay can be used to give you time to check deployments when they're pushed to devices. Deferrals function by letting you choose how many days after an update is published a device will be presented with it. The device won't install a feature update that has been available for less than 365 days if you select a 365-day feature update deferral period. Use the Select when Preview Builds and Feature Updates are Received policy to postpone feature updates.

| **Category** | **Maximum deferral period** |
|---|---|
| Feature updates | 365 days |
| Quality updates | 30 days |
| Nondeferrable | none |

## Pause an update

A feature or quality update can be put on hold for 35 days starting from a specified start date if a problem is found during deployment. This will stop other devices from installing the update until the problem has been resolved. Devices are still offered quality updates even if you postpone a feature update to keep them safe. A start date that you specify is used to determine the length of the pause for both feature and quality upgrades. The Select when Preview Builds and Feature Updates Are Received policy should be used to pause feature updates, and the Select when

Quality Updates Are Received policy should be used to delay quality updates. See Pause feature improvements and Pause quality upgrades for more details. Benefits that come with updating from Windows upgrade include built-in compatibility checks to guard against a bad upgrade experience for your device and a check to avoid frequent rollbacks. Windows Update for Business offers controls that make it easier to meet the security requirements of your business while still giving users a fantastic experience. We achieve this by giving you the ability to specify deadlines for quality and feature upgrades as well as automated updates at times that are convenient for the employees in your business. Using fewer controls to govern the user experience is preferable because Windows Update has built-in intelligence. You can specify different deadlines and grace periods for feature and quality upgrades using a compliance deadline policy, which was launched in June 2019.

With the help of this policy, you may determine how many days after an update's release date it needs to be installed on the device. The policy also offers a configurable grace period that details how many days must pass after the update has been put on a device before it must restart. This strategy is advantageous in a situation where people are on vacation since it gives them some breathing room before having to restart their gadgets when they get back from their trip, for instance.

## Activity

1. What is Windows Update for Business?
2. Explain what you understand by Windows Server Update Services.

# CHAPTER 40
# WINDOWS 11 FOR 2-IN-1 DEVICES

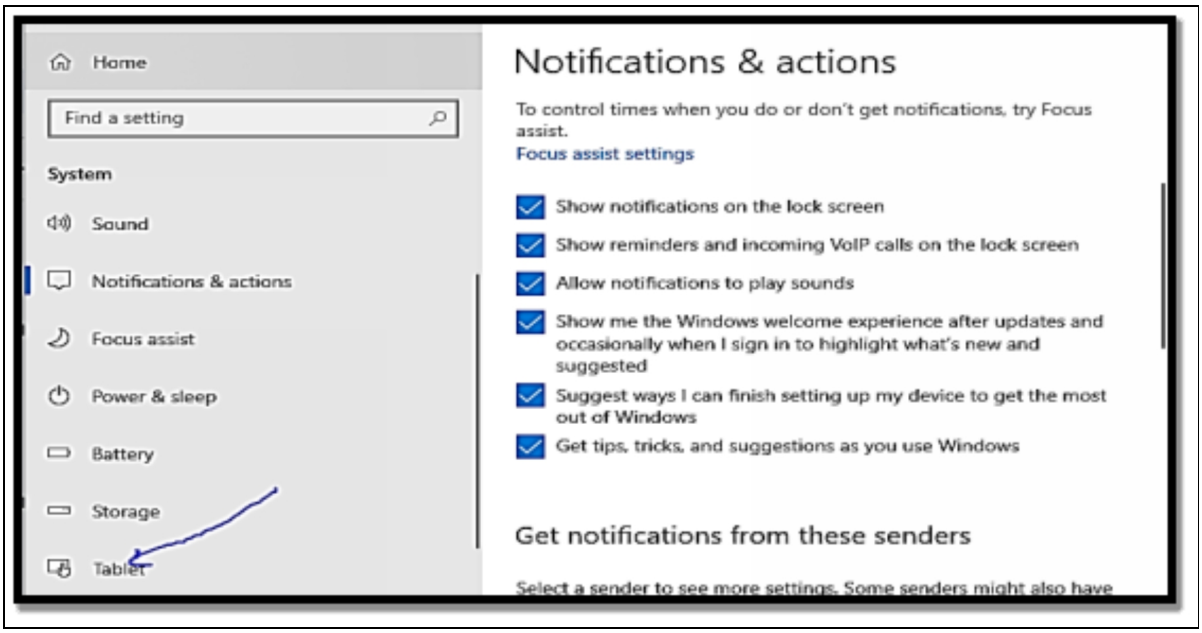
With 2-in-1 hybrid devices, which can serve as both laptops and tablets, Windows 11 is made to perform nicely. These gadgets often have a touchscreen interface and have many modes of operation, including laptop, tablet, tent, and stand. On 2-in-1 devices, Windows 11 delivers a number of improvements and optimizations that improve the user experience.

## Optimizing Touch and Pen Input

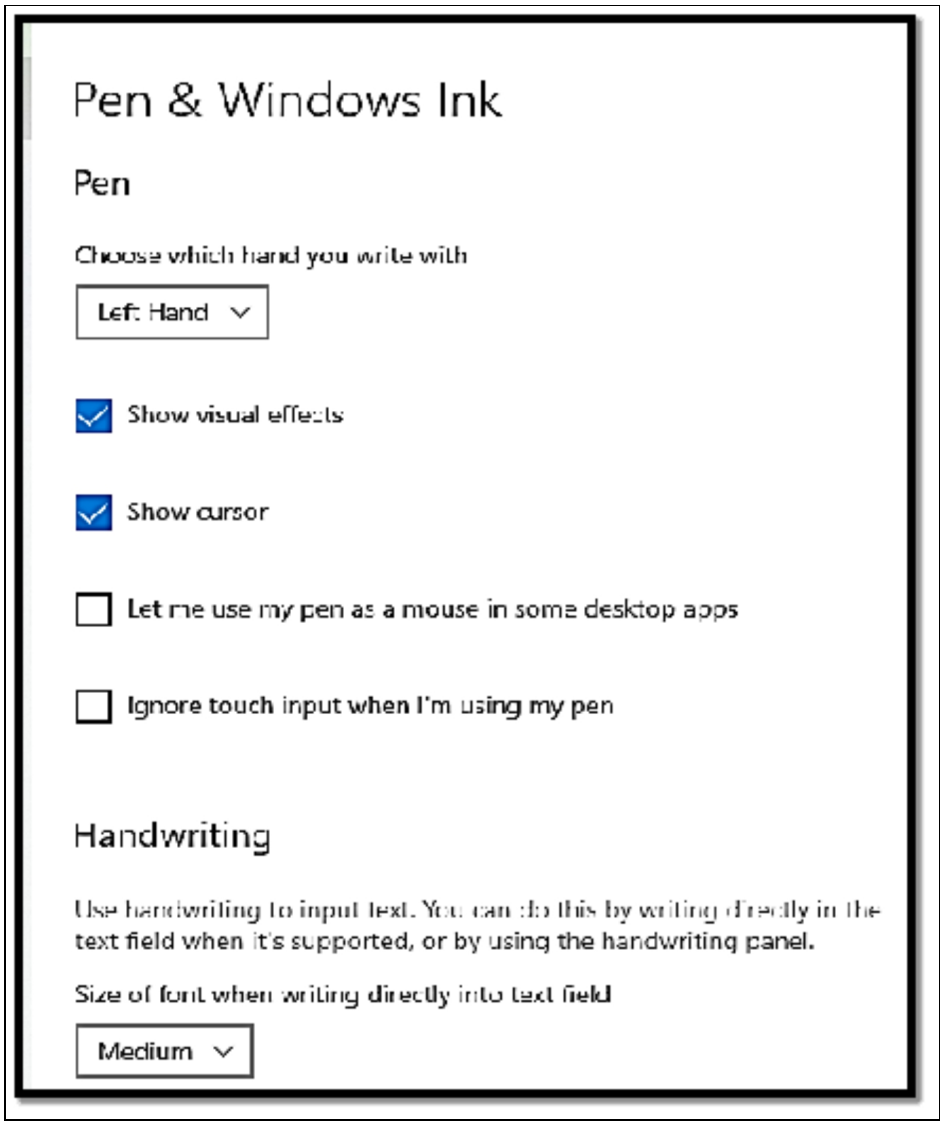
Your user experience can be enhanced by optimizing touch and pen input in Windows 11, especially if you use a touchscreen device or a stylus. Windows 11 offers a number of options and tools to improve the comfort and effectiveness of touch and pen input.

**Here are some tips for improving touch and pen input:**

- If you possess a 2-in-1 device or tablet, take into consideration the enabling of the Tablet mode. This mode helps with the optimization of the user interface for touch and pen input. Click **on the notification icon** in the taskbar and choose **Tablet Mode.**

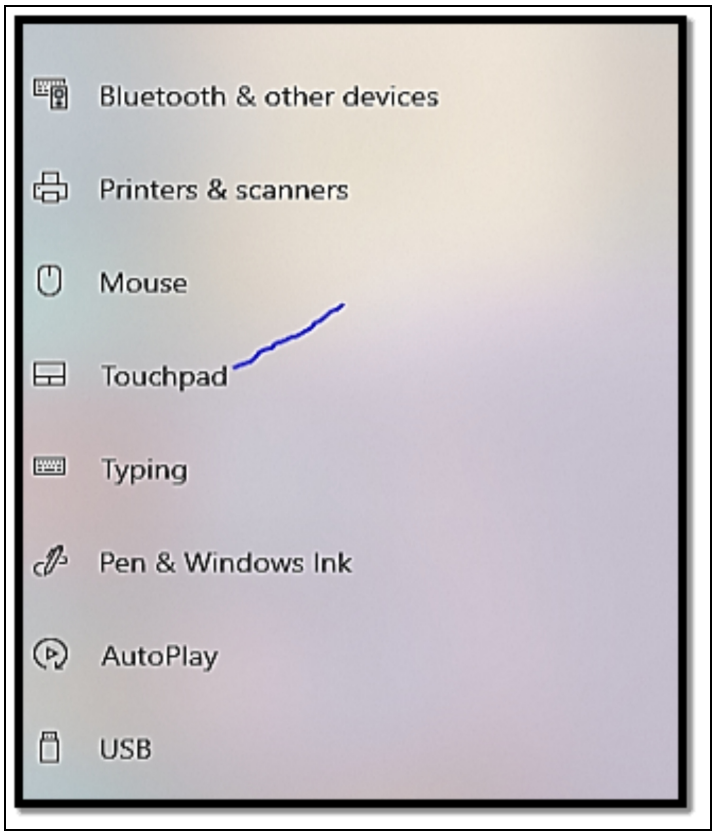



- If you are making use of a stylus or pen with your touchscreen device, its best you calibrate it for accurate input. Locate **Settings > Pen & Windows Ink**




- **And then follow the calibration wizard.**

- Enable the virtual keyboard by right-clicking **the taskbar** and choosing **“Show touch keyboard button” from the context menu.** This will then add a keyboard icon to the taskbar for ease of access.
- Moderate the Sensitivity settings by locating **Settings > Devices > Touchpad & Touchscreen**




- **And modify the touchscreen sensitivity slider.**

- Get yourself familiar with touch gestures like pinch-to-zoom, and touch-and-hold to navigate and interact with Windows 11 in a more efficient manner.
- For further enhancement of the touch experience, enable touch feedback. Go to **Settings > Devices > Touchpad & touchscreen**.

If you use a touchscreen device for business or play, Windows 11's enhancement of touch and pen input improves your productivity and overall user experience. To get the most out of your pen and touch capabilities, adjust your settings, calibrate your pen, and investigate touch-friendly apps.

## Tablet Mode and Continuum

Windows 11 has two innovations, Tablet Mode and Continuum that improve the user experience on touchscreen devices and 2-in-1

convertible laptops. Depending on the form factor and input method of the device, these elements aid in optimizing the user interface and functionality.

**An overview of Tablet Mode and Continuum is shown below:**

# Tablet Mode

Windows 11's Tablet Mode is a user interface setting created especially for touchscreen **devices like tablets and 2-in-1 laptops. Windows 11 modifies the user interface in numerous ways to make it more touch-friendly when you move to tablet mode:**

- **Start Menu:** This Start Menu becomes a full-screen Start screen with much larger tiles for touch input. This makes it much easier to open applications and also gain access to frequently used programs.
- **Taskbar:** The taskbar is simplified, with larger icons for ease of tapping. It can be instantly concealed to offer more screen space for applications.
- **App Windows**: Apps open in full-screen mode by default. Users are able to switch with ease between opened apps by swiping from the left side of the screen or making use of touch gestures.
- **On-Screen Keyboard**: The on-screen keyboard is also available by default, ensuring it becomes convenient for text input when the physical keyboard is not in use.
- **Notification Center**: The Action Center (notification center) is optimized for touch and offers swift access to system settings and notifications.
- **Task View**: Task View enables you to change between open applications and virtual desktops ensuring that you are able to multi-task with touch options.

**To get the tablet mode enabled,**

- Open the Action Center by selecting the notification icon in the taskbar then choose the **Tablet Mode button** to toggle **Tablet Mode on or off**.

## Continuum

With the help of the Continuum feature, Windows 11 automatically adjusts its functionality and user interface to the form factor and input method of the device in use. When you switch between tablet and laptop configurations on 2-in-1 devices, it enables a smooth transition between desktop and tablet modes. For instance, Windows 11 may instantly adapt to Tablet Mode and provide a touch-friendly interface when a keyboard is removed or the screen is rotated on a convertible laptop. It switches back to the conventional desktop mode when the keyboard is reattached or when you switch to a laptop configuration. When using a touchscreen, keyboard, or a combination of both, Windows 11 can still be used easily and effectively thanks to Continuum. It offers a constant and fluid experience across various device orientations and input techniques. With Tablet Mode and Continuum, it is simpler to transition between touch and keyboard/mouse input modes when necessary, adding to Windows 11's adaptability and versatility on contemporary touchscreen devices.

## Gesture Controls and Hybrid Usage

On hybrid devices like 2-in-1 laptops, convertible tablets, and touchscreen PCs running Windows 11, gesture controls and hybrid usage refer to the use of gestures, touch input, and other interaction modalities. These gadgets provide a flexible computing experience by combining standard keyboard and mouse input with touch and gesture-based controls. Here's a closer look at Windows 11's hybrid usage and gesture controls:

## Gesture Controls

Gesture controls let you interact with your device and its applications using a variety of touch-based motions. On touchscreen devices, these gestures are intended to improve control and navigation by making them more natural and effective.

**Windows 11, these are some typical touch gestures:**

- **Tap**: A single tap on the screen is just like making use of a mouse clock and can be used to choose items, open apps, or get actions done.
- **Double-Tap**: A double-tap gesture is most times used for zooming in on both text and images; it is also similar to the action of double-clicking with a mouse.
- **Swipe**: Swiping involves moving your finger across the screen in a particular direction. It is often used for tasks such as scrolling through web pages, and also flipping through pictures.
- **Pinch-to-Zoom**: This practice involves the use of two fingers on the screen either moving them apart or bringing them closer for the adjustment of the zoom level of content like images or web pages.
- **Three-Finger Swipe**: On certain systems, a three-finger swipe can be used to change between open apps or gain access to the Task View for multitasking.

## Hybrid Usage

Utilizing 2-in-1 devices, such as convertible laptops and tablets, in both tablet and classic laptop modes (using a touch screen and a physical keyboard), is known as hybrid usage. These gadgets give you the choice to switch between modes according to your requirements and preferences.

**Here are some tips for maximizing Windows 11's hybrid functionality:**

- **Tablet Mode**: Windows 11 may automatically transition to Tablet Mode when the keyboard on your 2-in-1 device is detached or folded. This mode offers a touch-centric user interface with bigger icons and a virtual keyboard, making it perfect for touch-based work and content consumption.
- **Laptop Mode**: Windows 11 switches back to a standard desktop interface with a keyboard and touchpad when you reattach the keyboard or transition to a laptop configuration. This mode is appropriate for typing documents, using desktop programs, and performing other productivity-related tasks.

- **Pen and Stylus Input**: Many hybrid gadgets have compatibility with styluses or pens. For precise drawing, note-taking, or annotating operations when using a tablet, use a stylus.

In Windows 11, hybrid devices provide a flexible computing environment by fusing the benefits of both touch and conventional input techniques. You can streamline your productivity and quickly transition between tablet and laptop modes by getting the hang of gesture controls and customizing settings.

# Activity

1. Optimize the touch and pen input on your device.
2. Highlight the difference between Tablet mode and Continuum
3. What are gesture controls?

# CHAPTER 41
# CUSTOMIZATION SYSTEM SOUNDS AND NOTIFICATION

Notifications and the notification center are familiar to everyone who has ever used a smartphone or tablet with a decent level of sentience. The main idea is that the device monitors and gathers notifications — brief alerts or status reports — and then places them in one location so that you can look at them and decide what to do from there. Different devices implement this in different ways. Notifications are common in Windows 11. You receive notifications from the operating system and many other apps. Even websites may alert you when fresh content is posted. Windows 11 collects notifications into a specific area, similar to how smartphones do, to make them manageable. It's simple to see and delete notifications. However, you can utilize the focus assist option to make notifications disappear immediately if you find them annoying or don't want to be interrupted while you're working. When something happens, Windows 11 or an app will send you a message with a brief sound known as a notification. The notification might be for anything, such as a new email message in the Mail app, an update to an app on your PC from the Microsoft Store, or the fact that you just plugged in a USB memory stick and Windows is asking you what to do with it. If you give websites permission to do so on your web browser, they can even notify you when new content is added.

## Managing System Sounds

The notification center is the location where notifications are kept. Next to the time and date in the bottom-right corner of the taskbar, a number appears when it has alerts for you to see. The figure indicates how many unread alerts you currently have. There is no

number if there are no fresh alerts available for you to view**. You can read a notice later, along with all the others you disregarded, if you didn't click or tap it when it was shown in the bottom-right corner:**

- In the bottom-right corner of the screen, choose **the date and time**. You will then see a calendar of the current month with a list of notifications at the top.
- Choose t**he downward-pointing arrow** to the right side of the current date. The notification center will then be made visible.
- Move the cursor of the mouse over the notification to see more options for interacting with it.
- If you would like to take off a notification, move the cursor of the mouse over it and choose the **X icon to its right**.
- If you would like to expand a notification, choose **the downward-pointing arrow** beneath the name of the app showing the notification.
- When there is no need for you to see the notifications, choose the **Clear All button** in the **top-right of the notification center**. Once done, this will clear all notifications from Windows 11 and create room for the new ones. Furthermore, the notification center will close due to the fact that it has no other things to show. If you choose the time and date as against clearing all of the notifications, the notifications will be kept mute but the notification center will close.

You can block a single software from producing notifications if you don't want to see them. Additionally, you may easily turn off all notifications if you find them unpleasant.

**Here's how to turn off all notifications or only those from a certain app:**

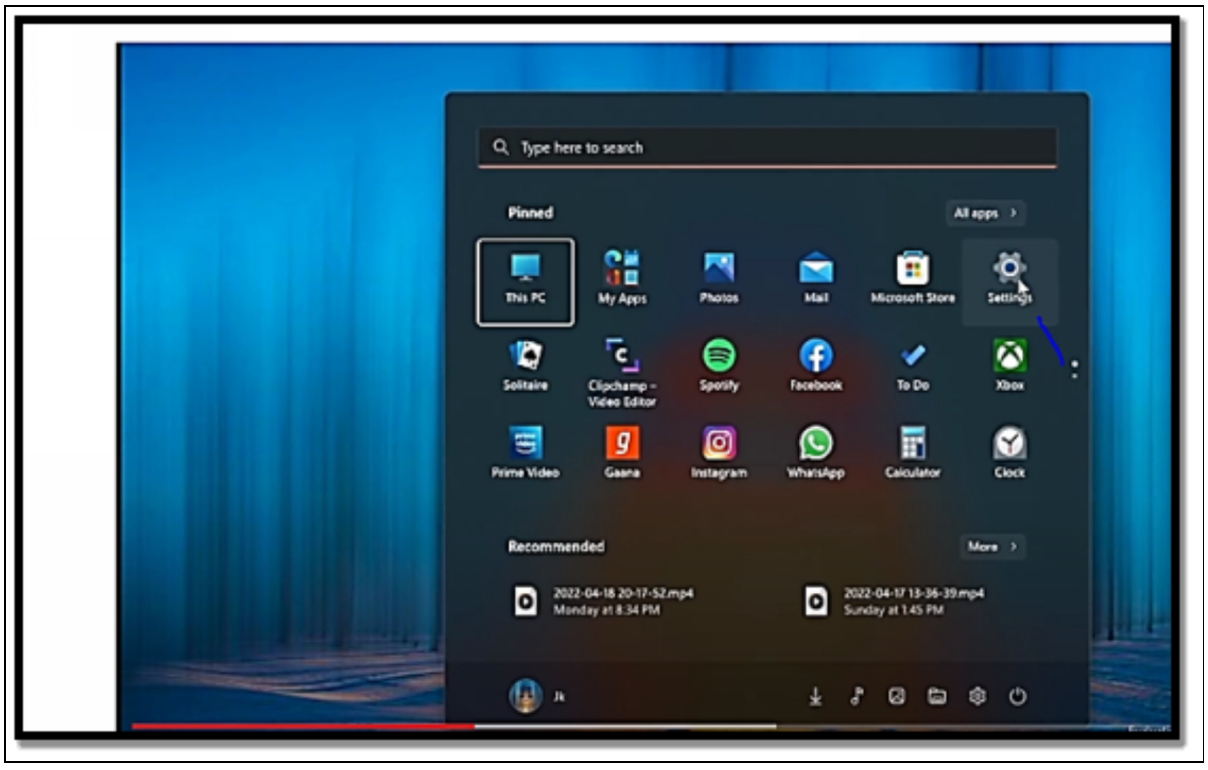
- Right-click **the time and date on the taskbar.**
- Choose **Notification settings.**
- If you would like to mute just one app, scroll down, locate the app, and move its toggle to off. If you would like to turn off all notifications from all applications, including Windows 11, choose **the Notifications switch on the top.**

Instead of adjusting an app's switch in Step 3, you can access choices for managing how its alerts are displayed by clicking or tapping the name of the app. You can, for instance, modify the number of alerts for that app that are visible in the notification center, disable the sound played for each notification, set the priority of the notice, and more.

## Customizing Notification Settings

In Windows 11, Notification Center is the exact place where you are able to locate app notifications and Quick Settings which offer swift access to frequently used configurations and apps. You can modify your notifications settings at any point in time from the Settings app.

- Choose **Start, then Settings**.




- Locate **System > Notifications**.

- **Do any of the following;**
    - Turn **notifications, banners, and sounds** on or off for certain notifications senders or all of them. To view all options available, you have to expand the notifications area.
    - You can also turn tips and suggestions about Windows On or Off.

## Syncing Notifications across Devices

The ability to have your PC linked with your phone has been around for some time and has also been improved upon over the years. In 2022, you can integrate your Android phone with your Windows 11 PC with the use of Microsoft's Phone Link app. All you have **to do is follow the steps below. The application will not just allow you to check the notification on your phone but you will also be able to send files and also make phone calls.**

- On your Windows 11 PC, open **the Start menu and locate Phone Link or Your Phone**, choose it, and select your Microsoft account.
- Open your phone and **download the Link to Windows app** from the Google Play Store. If you are using a Samsung phone, this app will be on your phone by default. Open the app on your phone and touch Link your Phone and PC.

- On your PC, choose the **I have the Link to Windows app ready**, a QR code will then be displayed which you will have to scan on your phone. On the phone, touch the QR code on your “PC is ready” option and get the code scanned. Windows will request permission to take pictures and record videos, and some other permissions.
- In some cases, your Windows PC will request that you enter a URL link in your browser as opposed to scanning the QR code. The URL will instantly pair it in the background.
- Once you are done, Windows 11 will show you around the app and ask that you pick it on the Taskbar. Nevertheless, there will be a need for you to touch on the Notifications option from the left side of the screen. Windows will then request permission to sync notifications.
- Choose **Open settings on the phone**. On your phone, you will see the Device and App notification menu in Settings. Find the Link to the Windows app in the list and get the toggle activated. Then choose Allow.
- Once the above has been completed, you will now be able to see all your notifications from your Android phone coming to your Windows 11 PC directly. You also will be able to reply to Whatsapp messages, and accept calls, provided a Bluetooth connection has been established.

## Activity

1. Customize the notification settings on your device.
2. Synchronize notifications settings across your devices.

# CHAPTER 42
# POWERSHELL DESIRED STATE CONFIGURATION (DSC)

Within a short period of time, PowerShell became the de facto automation tool for both the VMware and Microsoft Windows environments. PowerCLI, VMware's PowerShell snap-in, has been used extensively by VMware administrators to carry out operations and gather data on their virtual environments. Microsoft specialists have observed significant effort on the part of the corporation to enable PowerShell management of Microsoft Windows Server and Microsoft apps. Desired State Configuration, the newest PowerShell feature from Microsoft, was inspired by the technologies you have already studied in this book. This capability, which is sometimes referred to by the abbreviation DSC, enables Windows administrators to natively manage their environments with capabilities akin to those available in Puppet. The foundations of DSC and its operation are discussed in this chapter.

## Introduction to DSC

Microsoft's initial attempt to make PowerShell declarative, like Puppet, is DSC. This indicates that it takes advantage of the pre-existing underlying framework rather than scripting all the logic and instructions necessary to complete the operation. The DSC framework already has the rules and logic required to do the given task. This does not imply that the well-known imperative programming style is no longer necessary for automation. This is just one more highly scalable way to keep a Windows environment running. To achieve their intended result, users are no longer required to script or program the full set of actions. They only need to tell DSC which tasks should be carried out against which systems and under what conditions. The remainder is handled by the DSC framework. PowerShell's vital features will continue to be necessary in the future. In actuality, most administrators will continue to use

PowerShell in a mostly unaltered manner for activities like data collecting. Because DSC is integrated into the framework for doing those tasks, adopting it increases PowerShell's capacity to both apply and maintain consistency in how a Windows server or application is configured with significantly less programming needed.

There are numerous ways to manage a Windows server environment using DSC. In decentralized businesses, operating system (OS) teams handle this management more so than VMware administrators. It goes without saying that smaller companies may have important contributors who are in charge of both the operating system and the virtual environment. The primary focus of this book is on these technologies as seen through the eyes of a VMware administrator. Therefore, it's crucial to comprehend the most typical DSC usage scenarios that your development teams might employ.

**Common functionality for PowerShell DSC includes the following resources;**

- Managing and monitoring configuration state.
- Enabling or disabling Windows roles and features.
- Stopping and Starting Windows service and application processes.
- Deploying software.
- Managing
- Environmental variables
- Files and directories
- Groups and users
- Registry settings
- Writing messages to log
- Running PowerShell scripts which include PowerCLI if installed.

PowerShell 4.0 can be installed on Windows Server 2008 R2 with Service Pack 1 or Windows 7 Service Pack 1 in addition to being pre-installed on Windows Server 2012 R2 and Windows 8.1. The Microsoft.Net Framework 4.5, which is already pre-installed on Windows Server 2012 R2 and Windows 8.1, is also necessary for DSC to function properly. Although scripts built for earlier versions of

PowerShell can still be executed with PowerShell 4.0, DSC capability is only accessible in this version. Additionally, the Windows Management Framework (WMF) 4.0, which is a prerequisite for PowerShell 4.0, includes WS-Management 3.0 and WMI 3.0. Microsoft has as of this writing made the Windows Management Framework 5 preview available. It is significant to note that this version does provide a variety of fixes, optimizations, and speed enhancements even if it is not covered in this book. The configuration of Windows computers is made possible by a number of components that make up PowerShell DSC. To offer you an overview of the general architecture at work, this section goes through these essential elements.

## Native Cmdlets

PowerShell DSC is based on Windows PowerShell, first and foremost. As a result, you'll see a collection of PowerShell cmdlets and functions throughout this chapter that are built into DSC. Start a PowerShell session and type the following command to gain access to them:

```
Get-Command -Module PSDesiredStateConfiguration
```

## Managed Object Format File

The Managed Object Format (MOF) file is the brains of DSC. This file is often created by a PowerShell script, as covered in more detail in the following chapter. However, if a MOF file is formed correctly, it can be produced directly in a text editor and accepted by DSC. The ability of other companies to create MOF files for use in both Windows and Linux environments makes this a fascinating development for Microsoft. In reality, Microsoft has already made the first customer technology preview (CTP) of PowerShell DSC on Linux servers available as of this writing. This is outside the purview of this book because it is just under preview, but it is interesting to mention in light of the likelihood that DevOps businesses will make use of a variety of tools for resource delivery. PowerShell DSC is

definitely being developed by Microsoft to be usable in a variety of settings and scenarios.

## Local Configuration Manager

On each DSC-enabled system, the Local Configuration Manager (LCM) is the local engine that calls the resources in the configuration script. This is not only an essential part of the DSC architecture, but it can also be modified to meet the particular needs of each node. When it comes to how often it checks for updates, what it does when new configurations are discovered, and whether the node should operate in push or pull mode, these properties can control how LCM works. The specific configurations are applied using the Set-DscLocalConfigurationManager cmdlet. It's crucial to understand that the Get-LocalConfigurationManager cmdlet will offer you information about the LCM settings currently in effect for your system because DSC gives you the opportunity to change them.

Push and pull are the two distinct modes in which DSC is intended to operate. To conceive of DSC in three different ways, namely local push, remote push, and pull, might be simpler. Each alternative has particular benefits and drawbacks, but they are all included in the complete range of DSC capabilities.

## Local Push Mode

Using PowerShell DSC in local push mode is the simplest way to do it. The administrator just logs in, executes the configuration script locally, and starts the configuration locally using this approach. It is simple to put the example in the next "DSC Configurations" section into practice on a local level on a node.

## Remote Push Mode

The second method, called push mode, is likewise simple to use but comes with some extra conditions and restrictions. In this approach, an administrator would execute the configuration to a distant node or nodes by running the configuration script. The application of numerous nodes to the same configuration call and the generation

and availability of their unique MOF files are made possible by the use of PowerShell. Greater scale is provided by this, particularly in an agile setting where multi-tiered systems are frequently delivered. Push mode's one drawback is that each target node has to have PowerShell Remoting enabled. The Enable-PSRemoting cmdlet must be executed for each system in order to use push mode, or it must be included in the virtual machine (VM) templates. Domain Name System (DNS) must also be up-to-date in order for push mode to function properly. Because PowerShell Remoting is simpler to configure and DNS should be current once the node is on the domain, push mode is advised in scenarios where all nodes are on the same domain.

Additionally, the administrator's PowerShell session must be operating in administrator mode in order to remotely execute the DSC configuration. You can tell if you're in administrator mode by checking the PowerShell session's title bar. If you are not already in this elevated mode, you may enter it by right-clicking the PowerShell shortcut and choosing Run as Administrator.

## Writing DSC Configuration Scripts

Writing DSC (Desired State Configuration) configuration scripts in PowerShell enables you to define and keep the preferred state of Windows-based systems. DSC is a very powerful tool for the automation of the configuration and management of Windows servers and workstations.

**Below are the basic steps to create DSC configuration scripts;**

- **Install the DSC Module**: If you have not already, there will be a need for you to be sure that the DSC module is installed on your computer. You can install it with the use of the Install-Module command of PowerShell.
- **Create a Configuration Script**: A DSC configuration script is a PowerShell script that helps to define the preferred state of a system.
- **Define Configuration Settings**: Within the configuration script, define the configurations you would like to configure.

These configurations can include items like file paths, registry keys, Windows features, and more.

- **Compile the Configuration**: After defining the preferred state, there is a need for you to compile the configuration into a DSC configuration script (.mof file). Make use of the configuration Name parameter to indicate the name of your DSC configuration.
- **Apply the Configuration**: To apply the DSC configuration, make use of the Start-DscConfiguration cmdlet. Give the path to the compiled .mof file, which has your configuration settings.
- **Monitor and Verify**: Upon the application for the DSC configuration, monitor and verify that the system is moving toward the preferred state. You can choose to make use of the Get-DscConfiguration and Test-DscConfiguration cmdlets to check the current configuration and compliance status.
- **Create Custom Resources (Optional):** DSC offers built-in resources for common configuration tasks, but you can also choose to create custom DSC resources for more specialized configurations. These resources are typically defined as PowerShell modules and you can load them into your DSC configuration script.
- **Document your Configuration**: It is of great importance for you to document your DSC configuration scripts, which include the purpose of the configuration, the expected outcomes, and any other form of dependencies. Good documentation aids with troubleshooting and future maintenance.
- **Deploy and Manage Configurations**: You are at liberty to deploy DSC configurations to various systems, and you can make use of configuration management tools such as Azure Automation DSC or a pull server for the management and application of configurations at scale.
- **Update and Maintain**: As your infrastructure continues to evolve, there may be a need for you to update and alter your DSC configurations. Ensure that you put to test the changes well enough before having to deploy them in production.

DSC configuration scripts can be quite simple or complex, it all depends on your needs. They are valuable tools that are often used to ensure consistency and automate configuration management in Windows environments.

## Activity

1. What is DSC all about?
2. What are the steps to writing DSC configuration scripts?

# CHAPTER 43
# WINDOWS 11 SECURITY BEYOND BASICS

Getting Windows 11 secured beyond just the basics has to do with the implementation of advanced security practices and tools for the protection of your system and data from any form of threat. Some of the ways in which this can be done include the use of device guard; which is advanced security in Windows 11 Enterprise and Pro that makes use of hardware-based security to ensure adequate protection against any form of malware and also the use of credential guard that helps in keeping credential information safe. In this chapter, you will also learn about the use of Microsoft Defender ATP (Advanced Threat Protection) which is used in gaining enhanced threat detection, investigation, and response capabilities.

## Application Control Policies (AppLocker)

In this section, you will learn all you need to know about app locker and you will also be able to make an apt decision as regards the deployment of APPlocker application control policies for your organization. With the use of AppLocker, you are able to control any of the applications and files that are being executed by a user. All of these also include executable files, scripts, Windows Installer files, dynamic-link libraries (DLLs), packaged apps, and packaged app installers.

**You are able to do the following with the use of the AppLocker;**

- State rules are based on file attributes that persist across various application updates, like the name of the publisher (gotten from digital signature), product name, file name, and also the version of the file. You can also design rules depending on the path of the file and hash.
- Get a rule assigned to a security group or an individual user.

- Design exceptions to rules. For instance, you are able to design a rule that enables all users to execute all Windows binaries, except the policy, and comprehend its impact prior to the enforcement of the rule.
- Make use of the audit-only mode in the deployment of the policy and comprehend its impact prior to its enforcement.
- Design rules on a staging server, get the rules tested, export them to your production team, and then import them into a Group Policy Object.
- Simplify the creation and management of AppLocker rules with the use of Windows PowerShell.

AppLocker helps with the reduction of administrative overhead and also helps with the reduction of the cost of the organization in terms of the management of computer resources by the reduction of the number of Help Desk calls that emanate from users executing unapproved applications.

**AppLocker helps to address the following application security scenarios;**

- **Application inventory:** AppLocker can enforce its policy in an audit-only mode wherein all of the application access activity is well registered in event logs. These events can be gotten for more analysis. Windows PowerShell cmdlets also aid in the analysis of this data in a programmable manner.
- **Protection against unwanted software**: AppLocker can choose to deny applications from being executed when they are excluded from the list of enabled applications. When the rules binding AppLocker become enforced in the production area, any application that is not included in the enabled rules will be blocked instantly from being executed.
- **Licensing conformance**: AppLocker can aid the creation of rules that preclude unlicensed software from executing and also restrict licensed software to users who are authorized.
- **Software standardization**: The policies of AppLocker can be configured to enable just supported or approved applications to be executed on computers that are within a business group.

This configuration allows for a more uniform application deployment.

- Manageability Improvement: AppLocker has so many improvements in management as compared to its predecessor Software Restriction Policies. Having to import and export policies, automatic generation of rules from various files, audit-only mode deployment, and Windows PowerShell cmdlets are just a few of the improvements over Software Restriction Policies.

## When to use AppLocker

In many organizations, information is quite the most valuable asset, making sure that only approved users gain access to that specific information. Access control technologies, like Active Directory Rights Management Services (AD RMS) access control lists (ACLs), aid the management of what users are permitted to gain access to. Nevertheless, anytime a user executes a process, that process has just the same level of access to data that the user has. As a result, if a user accidentally or maliciously runs software, important information could simply be destroyed or sent outside of the organization. By limiting the files that people or groups can run, AppLocker helps lessen these kinds of security breaches. More apps that can be installed by non-administrative users are starting to be produced by software companies. This permission might compromise a company's written security policy and defeat established app control techniques that rely on users' incapacity to install apps. To assist in stopping such per-user programs from running, AppLocker makes a list of authorized files and apps that are allowed to be downloaded. AppLocker's ability to manage DLLs makes it ideal for limiting who can set up and use ActiveX controls. AppLocker is best for organizations that currently make use of Group Policy for the management of their PCs.

**Below are the examples of scenarios in which you can choose to make use of AppLocker;**

- You have a need to prevent users from running illegal software and limit the usage of licensed software to those who are

allowed by your organization's security policy, which requires that only licensed software be used.

- Your company no longer supports a certain app, so you need to stop people from using it.
- You need to lessen this threat because there is a great possibility that undesirable software will be delivered into your environment.
- You need to stop everyone from using an app since the license has either expired or been revoked at your company.
- You need to stop users from using the previous version of an app after it has been updated or released as a new version.
- Within the company, certain software tools are prohibited, or only certain users should be able to use them.
- The use of a certain app is restricted to a single user or a small group of users.
- You need to secure particular programs since some machines in your company are used by a variety of users with various software requirements.
- You must limit the use of apps to access sensitive data in addition to taking other precautions.

AppLocker is not a security boundary but rather a defense-in-depth security tool. When a danger needs to be effectively protected against, and there shouldn't be any by-design restrictions that would prohibit the security feature from doing so, Windows Defender Application Control should be employed. With the aid of AppLocker, you can better manage application control and maintain application control policies while lowering the risk of harmful malware entering your environment and safeguarding the digital assets within your company.

# Installation

Enterprise-level Windows versions come with AppLocker. AppLocker rules can be created for a single computer or a collection of computers. The Local Security Policy editor (secpol. msc) is where you write the rules for a single computer. Using the Group Policy Management Console (GPMC), you can create the rules within a

Group Policy Object for a collection of computers. Only after installing the Remote Server Administration Tools is GPMC accessible on client machines running Windows. The Group Policy Management functionality has to be installed on a PC running Windows Server. Which applications are permitted to operate on the local computer is determined by application control policies. Users find it challenging to determine which malicious software is safe to execute due to the variety of shapes that it might take. When launched, malicious software can harm data on a hard drive, overwhelm a network with requests to launch a DoS attack, send private information to the Internet, or jeopardize a computer's security. The remedy is to build sound application control policies for PCs in your business and test such policies rigorously in a lab setting before using them in a live environment. Due to its ability to limit the types of applications that can be used, AppLocker can be a part of your app control strategy.

A poorly implemented application control policy may disable necessary programs or permit the execution of harmful or unwanted software. It is crucial that businesses allocate enough resources to oversee and troubleshoot the execution of such regulations.

## Credential Guard and Device Guard

Credential Guard helps with the prevention of theft attacks by helping to protect NTLM password hashes, Kerberos Ticket Granting Tickets (TGTs), and credentials saved by the use of applications as domain credentials. Credential Guard makes use of Virtualization-based security 9VBS) for the isolation of secrets so that privileged system software is able to gain access to them. If access that is unauthorized gets to these secrets, it can lead to credential theft attacks such as “pass the hash” and “pass the ticket”. **When allowed, Credential Guard offers the following benefits;**

- **Hardware security**: NTLM, Kerberos, and Credential Manager make use of the advantage of the platform security features like Secure Boot and virtualization for the protection of the credentials.

- **Virtualization-based security**: NTLM, Kerberos gets credentials and other secrets executed in a protected environment that is removed from the executing operating system.
- **Protection against advanced persistent threats**: Whenever credentials are protected with the use of VBS, the credential theft attack techniques and tools that are used in so many targeted attacks are blocked. Malware being executed in the operating system with administrative privileges cannot get secrets that are well protected by VBS. While Credential Guard is a powerful mitigation, persistent threat attacks will most likely move to new attack methods, and you ought to also incorporate other security measures and architectures.

# System requirements

For Credential Guard to offer protection, the devices ought to meet some hardware, firmware, and software requirements. Devices that meet more hardware and firmware qualifications than the lowest requirements, get more protections and more hardened against some threats.

# Hardware and Software Requirements

### Credential Guard needs the following features;

- Virtualization-based security (VBS); It is worth noting that VBS has various requirements to allow it on diverse hardware platforms.
- Secure Boot: While it is not needed, the following features are advised to offer additional protections;
    - Trusted Platform Module (TPM), as it offers binding to hardware. TPM versions 1.2 and 2.0 are supported by either discrete or firmware.
    - UEFI lock, as it prevents attackers from having to disable Credential Guard with the use of a registry key change.

# Credential Guard in virtual machines

Credential Guard can keep secrets in Hyper-V virtual machines, just as it would on a physical machine. When Credential Guard is allowed on a VM, secrets are protected from attacks inside the VM. Credential Guard does not offer protection from system attacks that originate from the host.

**The requirements to execute Credential Guard in Hyper V-virtual machine are;**

- The HyperV host ought to have an IOMMU
- The Hyper-V virtual machine ought to be generation 2

# Application requirements

When Credential Guard is allowed, some authentication capabilities are blocked. Applications that need this kind of capability break. These requirements are none as application requirements. Applications ought to be tested before deployment in order to be sure of compatibility with the reduced functionality. Getting to enable Credential Guard on domain controllers is not recommended. Credential Guard does not offer any more security to domain controllers and can lead to application compatibility issues on domain controllers. Credential Guard does not offer protection for the Active Directory database or the Security Accounts Manager (SAM). The credentials kept by Kerberos and NTLM when the Credential Guard is allowed are also in the Active Directory database (on domain controllers) and the SAM (for local accounts).

**Applications break if they need the following;**

- Kerberos DES encryption support
- Kerberos unconstrained delegation
- Extracting the Kerberos TGT
- NTLMv1

**Applications prompt and show credentials to risk if they need;**

- Digest authentication
- Credential delegation
- MS-CHAPv2

Applications may lead to performance issues when they make an attempt to hook the removed Credential Guard process LSAIso.exe. Services or protocols that rely on Kerberos, like file shares or remote desktops, proceed to work and are not affected by Credential Guard.

## How Credential Guard works

Kerberos, NTLM, and Credential Manager remove screws that are being used by Virtualization-based security (VBS). The previous versions of Windows saved secrets in its process memory, in the Local Security Authority (LSA) process lsass.exe. With Credential Guard enabled the LSA process in the operating system talks to a component known as the isolated LSA process that saves and keeps those secrets, LSAIso.

Exe, Data saved by the removed LSA process is protected with the use of VBS and is not accessible to the other aspects of the operating system. LSA makes use of remote procedure calls for communication with the removed LSA process. For reasons based on security, the removed LSA process does not host any device drivers. Rather, it just hosts a little subset of operating system binaries that are needed for security and nothing more. All of the binaries are signed with a certificate that is trusted by VBS, and the signatures are then validated prior to opening the file in the protected environment.

## Enabling Credential Guard

Credential Guard ought to be enabled prior to when a device is joined to a domain or prior to a domain user signing in for the first time. If Credential Guard is allowed after domain join, the user and device secrets may have been compromised beforehand.

**Follow the steps below to get your device configured;**

**Create a group policy object (GPO) and then make use of the following settings;**

| Group policy path | Group policy setting | Value |
|---|---|---|
| Computer Configuration\Administrative Templates\System\Device Guard | Turn On Virtualization Based Security | Enabled and then choose one of the options listed beneath the Credential Guard; Configuration dropdown;<br>-Enabled with UEFI lock<br>-Enabled without lock |

If you would like to be able to switch Credential Guard remotely, choose the option Enabled without lock. The policy configuration can be configured locally by making use of the Local Group Policy Editor (gpedit. msc), synced to the domain or organizational units, and filtered to security groups. Once the policy has been applied, restart the device.

## Verify if Credential Guard is enabled

Checking the Task Manager if LLsaIso.exe is being executed is not a recommended strategy for determining if Credential Guard is running.

**Rather, make use of the following methods;**

- System Information
- PowerShell
- Event Viewer

**You can choose to make use of System Information to determine if Credential Guard is being executed on a device.**

- Choose Start, type msinfo32. Exe, and then choose System Information.
- Choose System Summary.

- Confirm that Credential Guard is being displayed close to Virtualization-based Security Services Running.

Device Guard, a firmware feature in Windows 11, prevents the loading of untrusted, unsigned, and unapproved programs and operating systems. We've already discussed the requirement for an operating system that checks everything that is sent to it and loaded into its RAM before running it. Even if we have few options today, relying solely on anti-malware software is not advisable. Before it can begin scanning the apps being loaded into the mind, an anti-malware program must first be put into memory. Device Guard's primary job in Windows is to test each process that is loaded into memory for execution both before and after the boot process. It would verify authenticity based on the applications' correct signatures and would forbid any process from loading into memory if it lacked a correct signature. Microsoft's Device Guard makes use of hardware-level technologies rather than software-level technology, which may be less effective in spotting malware. The use of virtualization also enables the computer to make accurate decisions about what to allow and what to restrict from being loaded into memory. Even if the attacker has complete control over the computers where the guard is placed, this isolation will stop malware. The Guard has its own algorithms that will prevent the malware from being executed, so they may try, but they won't be able to execute the code.

Only pre-approved programs may be processed during boot time thanks to the Windows Guard. IT developers have the option of configuring the system to approve or disapprove each application coming from a reputable vendor. No matter how it is set up, Windows Guard will only allow authorized applications to operate. The signature of the application developer will often determine which applications are authorized. This changes the boot choices. Operating systems that lack validated digital signatures won't be able to be loaded by Windows Guard. However, getting any application or OS certified doesn't require much.

**To make use of the Device Guard, there is a need to install and configure the following hardware and software;**

- Device Guard only works with devices running Windows 11/10.
- UEFI. It includes a feature known as Secure Boot that aids the protection of the integrity of your device within the firmware itself.
- Trusted Boot. It is simply an architectural change that aids the protection against rootkit attacks.

- Virtualization-based security. A Hyper-V protected container that removes the sensitive Windows 11/10 processes.
- Package inspector tool. A tool that aids the creation of a catalog of the files that need signing for Classic Windows applications.

## Exploit Protection and Windows Defender ATP

Exploit defense helps defend against malware that spreads and infects computers using exploits. Numerous mitigations that can be used on the operating system or specific programs make up exploit protection. Some exploit protection features, especially Export Address Filtering (EAF) and Import Address Filtering (IAF), are incompatible with .NET 2.0. The use of EAF and IAF is not supported if .NET 2.0 is enabled. Windows 10 and Windows 11 come with default configurations for exploit protection. Each mitigation can be turned on, off, or back to its default setting. Some mitigating factors offer more choices. These settings can be exported as an XML file and applied to different devices. Mitigations may also be set to audit mode. Without interfering with the device's regular operation, audit mode enables you to test how the mitigations would operate and evaluate events.

- Open the **Windows Security app** by either choosing the shield icon in your taskbar or by searching for Security in the Start menu.
- Choose the **App & browser control tile** (or the app icon on the left menu bar) and then choose Exploit protection configurations.
- Locate **Program settings** and select **the app** you would like to add mitigations to.
    - If the app that needs to be configured has already been listed, choose it and then choose **Edit.**
    - If the app has not been listed, at the top of the list choose **Add program to customize** and then make a choice of just how you would like to add the application.
    - Make use of Add by program name to have the mitigation added to any process being executed with that name. Indicate a file with its extension. You can choose to insert a complete path to reduce the mitigation to just the app with that name in that location.
    - Make use of Choose the exact file path and make use of a standard Windows file picker window to locate and choose **the file you prefer.**
- After choosing the app, a list of all of the mitigations that can be applied will be listed. Selecting Audit will add the mitigation in audit

mode alone. You will then be notified if there is a need for you to restart the process or app, or if there is a need for you to restart Windows entirely.

- Take steps 3-4 once more for all of the applications and mitigations you would like to configure.
- Beneath **the System settings option**, locate **the mitigation** you would like to configure and then indicate any of the following settings. Applications that are not configured individually in the Program settings option can make use of the configurations that are here;
    - **On by default**: The mitigation is allowed for applications that do not have this mitigation configured in the app-specific Program settings option.
    - **Off by default**: The mitigation is disabled for applications that do not have this mitigation configured in the app-specific Program settings option.
    - **Use default**: The mitigation is either enabled or disabled, based on the default configuration that is configured by Windows 11 installation; the default value (0n or off) is always indicated close to the Use default label for each mitigation.
- Take step 6 again for all the system-level mitigations you would like to configure. Choose Apply when you are done completing your configuration.

## Windows Defender ATP

Windows users have access to a unified security platform thanks to Windows Defender Advanced Threat Protection. It has a wide range of functionality, including antivirus, hardware-based isolation, and others. Windows Defender ATP's primary objectives are threat detection, analytics, and automated responses in order to both detect potential breaches before they occur and be able to respond to breaches as rapidly as possible once they do. There are three service tiers. It guards against host invasions, fileless, and file-based attacks, and makes an effort to control top-layer programs. Microsoft's next-generation antimalware technology enables all of this. "Endpoint behavioral sensors," which are present in each device's operating system, are used in the process. Data is continuously collected by Windows sensors and sent back to the Microsoft Defender cloud instance specifically for your business. Microsoft Defender ATP then assesses the behavior of the applications running on the computers in your workplace to determine if anything seems to constitute a threat. You can use the power of the cloud to fight against threats that are getting more

complex and pervasive with Microsoft Defender Advanced Threat Protection. You can locate and look into security incidents that happen within your organization with a cloud security solution that can manage the most demanding analytical workloads. Below are the instructions for configuring Microsoft Defender Advanced Threat Protection.

- Search on Google as Microsoft Endpoint Manager.
- Choose **Endpoint Security Antivirus**. With the use of the Microsoft Defender Antivirus profile type, select an existing policy or design a new policy.
- Locate Threat History, and choose **Report file**. You can choose to remove any threat if you find it.
- There is also a need for you to confirm that the configurations are switched on as; Set Microsoft Defender Antivirus Extended Timeout in Second to “50”, Cloud-delivered Protection Level to “High”, and Turn on Cloud-delivered Protection to “Yes”.

# Activity

1. Briefly describe application control policies, credential guard, and device guard.
2. Enumerate exploit protection and Windows Defender ATP.

# CHAPTER 44
# WINDOWS 11 FOR CONTENT CREATORS

The term "content creation" refers to the process through which users can create rich material that is more accessible. It aids in delivering an integrated and highly realistic usability experience across clients, the Web, several devices, and other line-of-business applications. With its array of cutting-edge tools and capabilities, Windows 11 offers all the solutions to quench your creative thirst. Even the most challenging or boring jobs may be made enjoyable by combining lightning-fast, lightweight hardware with the convenience and personalization features of Windows 11. Digital content is the fuel that powers our digital age. A vital method of expression for people, especially young college students, is producing content on the internet. Windows 11 has all the tools and features needed to succeed in these fields, and the number of young vloggers, social media influencers, content producers, and game streamers is on the rise.

For content creators to display their works, Windows 11 supports a wide range of artistic design applications, including Photoshop, Lightroom, Paint, and Illustrator. It has never been so simple to edit photos flawlessly or produce digital artwork. Amazing video editing features are included with Windows 11 for vloggers and social media influencers. With the abundance of editing tools available in the Windows 11 ecosystem, like Adobe Premiere Pro, Lightworks, Blender, and Wondershare Filmora, you can truly express your creativity in the video you produce.

## Using Windows Ink Workspace for Creative Work

With Windows Ink, you can write notes, memos, and documents in your own handwriting and send or store them electronically. This gives you the most engaging and hands-on writing experience possible. The introduction of Windows Ink opens doors to more

instantly controllable written compositions in a dynamic manner as well as more recognizable or authentication-friendly signature files. Windows Ink is a collection of pen-driven experiences that enable you to move written thoughts into action. **Windows Ink was created with two fundamental tenets in mind:**

- to make all pen-and-ink experiences incredibly accessible so you feel confident when you pick up your pen, and
- To give you a reason to pick up a digital pen in the first place as well as to deliver compelling experiences that will encourage you to use that pen in Windows on a daily basis.

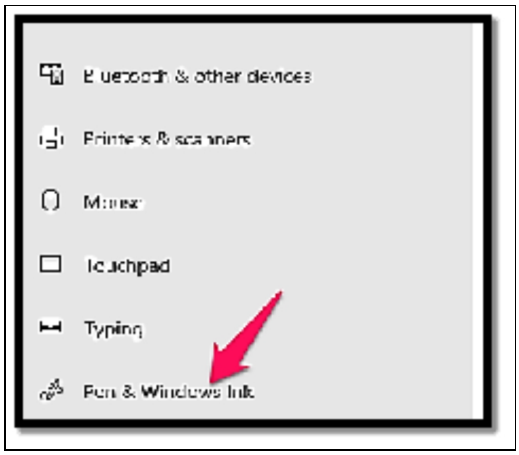
The Windows Ink Workspace, which unifies all the ink-powered features and programs on your PC in one organized and convenient UX canvas, is the most notable addition to the Windows 11 release.

- Click or press **the pen-shaped Windows Ink Workspace icon** that displays in your notification area to start the program.

If your stylus or digital pen has a shortcut button, you can also rapidly start the Windows Ink Workspace by pushing the button on the pen. For instance, you can start the workspace by pressing the Surface Pen's button. The Settings app allows you to change what the button performs; at least, that is the default configuration. For using a pen to complete activities, the Windows Ink Workspace functions as a Start menu. Instead of looking for specific programs, you simply take out your pen, click the button, and tap the app of your choice with the pen. It gives rapid access to apps like the new Sticky Notes, Sketchpad, and Screen Sketch tools as well as quick shortcut tiles to launch recently used pen-enabled apps. It appears as a sidebar on the right side of your screen. These shortcut tiles are just one more way to locate and open apps that support the pen without interfering with any of your currently installed programs.

**To customize the Windows Ink Workspace,**

- Go to **Settings > Devices > Pen & Windows Ink**.




There are numerous choices for managing your pen and the Windows Ink Workspace. For instance, you may let Windows know whether you write with your right or left hand and specify what happens when you click, double-click, or long-press the pen's button.

## Advanced Photo and Video Editing Tools

A variety of tools and capabilities in Windows 11 make it simple to edit your films. If you use Windows 11, you can utilize Clipchamp, a video editing program that is already included in your web browser. There are several third-party programs available on the market that are compatible with Windows 11 and are free to use if you're looking for new video editing software.

## Clipchamp

Users of any ability level can produce and edit high-quality videos utilizing a variety of video editing options with Clipchamp in Windows 11. With the collection of free editing tools from Clipchamp, you can cut or split your movies as well as add text, effects, transitions, music, and more. To elevate your movies beyond the fundamentals, Clipchamp provides cutting-edge capabilities like green screen effects, overlays, AI voice overs, and motion graphics. Clipchamp is the ideal option for privacy protection. In contrast to other video editing programs, Clipchamp edits video files locally on your computer rather than sending them to a server.

This implies that, unless you choose to share them, your video files never leave your computer. You can use Clipchamp for free and begin editing videos right away. If you require them, Clipchamp offers extra stock movies, brand kit templates, and other paid extras that allow you access to improved special effects. If you use Windows 11, Clipchamp is already included in the operating system and will fit in just fine with your existing workflow. To begin editing your movies if you're using an older version of Windows, go to Clipchamp in the Microsoft Store. Whatever your setup, Clipchamp is a robust and adaptable video editing application that aids in the realization of your artistic goals.

## OpenShot

For Windows 11, there is a free and open-source video editing program called OpenShot. Both pros and amateurs enjoy using its tools for trimming, cutting, and applying effects to your films because of its simple interface. OpenShot is helpful for multimedia projects because it is also compatible with a variety of audio and video formats.

## Shotcut

Another free and open-source video editing program, Shotcut works with Windows 11. You may trim, chop, merge, and add effects to your videos using this application. Shotcut, like OpenShot, allows a range of video and audio editing in addition to a range of visual effects, such as color grading, green screen, and 3D animation. Due to Shortcuts versatility, users can alter the application's user interface to maximize productivity and usability.

## VSDC Free Video Editor

A free video editing program, VSDC Free Video Editor is exactly what it says it is. It comes with a wide range of tools for video editing, audio enhancement, voiceover recording, screen recording, and other tasks. Windows 11 makes it simple to edit and produce films

directly from your desktop in addition to enhancing your entire computing experience.

## Color Management and Calibrating Display

If you have a need to assign various color profiles to diverse display devices, make use of color management. This will help lead to the creation of a unique color experience across all of your devices.

**Oftentimes, Windows manages this on its own, but if there is a need for you to install and also assign a custom color profile, follow the steps below;**

- In Color Management, locate **All Profiles and choose Add.**
- Move to the color profile (.ICCfile) you would like to include and choose **Add**. The profile will be added to the list instantly.
- If you would like to add a color profile to a certain device, locate the Devices tab, and choose your display in the Device drop-down.
- Choose the **Use my settings for this device checkbox**. This will enable you to make any changes to the color profile settings of the device.
- Choose the **Add button**, choose **the profile you would like to use for that device, and choose OK.**
- If there is a need for you to make use of this profile as the default for the device, choose it in the list and then choose **Set as Default Profile.**

The way we shop has been changed by technological changes. You can now purchase clothing, furniture, and other favorite items online without having to travel to a physical store thanks to developments in e-commerce. Additionally, you can make sure that your online purchases appear exactly how you expected them to by using the built-in color calibration option in Windows 11. Before you go on your next online buying spree, learn how to calibrate the colors on your screen. Color calibration which can also be described as display or monitor calibration can be said to be the process of fixing your screen so it can display colors in an accurate manner. If you have once had a need to place an order for something online and you

have a feeling the color does not match what you had seen on your screen, this issue might have to do with the manner in which your monitor is calibrated. Photographers and designers are highly dependent on well-calibrated displays to their pictures and designs are shown just the exact same on a printed copy. With the use of a well-calibrated monitor, the colors on your display will align consistently with the actual product. It is quite easy to calibrate your Windows 11 display, and it can be done in the settings of your device.

**Below are some steps to follow on how to alter your color configurations;**

- Open your **control panel**: The fastest way to locate the calibration tool is by looking for it in your **Control panel**. You can gain access to your Control Panel by searching for it in Windows Settings.
- Locate **Color Management**: Once the **Control Panel has been opened**, look for C**olor Management** in the search bar at the top of the Window. Locate the Color Management configuration, then choose the **Advanced tab to locate options for display calibration.**
- Choose the c**alibrate display button**: Choose the **Calibrate display button** close to the bottom of the window. There might be a need for you to insert your username and password prior to making any more changes to your device. Once you have inserted the information, Windows will offer you an explanation of how to alter your display settings.
- Read the instructions on how to modify your screen: You will be able to select various options for altering your color settings. Adjust your gamma and brightness levels to what suits you the most. A reference image will be given to you as a guide. Once you are content with the changes you must have made, you can choose the Finish button in order to have your settings updated.

You may adjust your video display through settings if you want to take your color alterations a step further. If you are watching a video

ad for a product you are thinking about purchasing or if you want to improve the quality of your films, color calibration for your video display may be beneficial. You can change your video quality by going to

- **Settings > System > Display > HDR > Display calibration for HDR video > Calibrate**.

# Activity

1. What is Windows Ink Workspace and what is it used for?
2. Mention 3 video editing software.
3. Calibrate the display of your device.

# CHAPTER 45
# WINDOWS 11 AND INTERNET OF THINGS (IOT)

In order to power Internet-connected devices and allow IoT solutions, Windows 11 IoT (Internet of Things) was specifically created. It provides a compact and safe platform for creating applications and smart devices.

**Important features of Windows 11 IoT include;**

- **Device-focused**: Windows 11 IoT includes various editions that meet the needs of various device classes, like Windows 11 IoT Core for small-scale devices and Windows 11 IoT Enterprise for a more robust deployment. These editions offer the flexibility to select the needed version for your IoT needs.
- **Scalability and Customization**: Windows 11 IoT offers scalability to bring in a wide range of IoT devices, from small sensors to huge industrial machines. It enables developers to personalize the operating system depending on the certain needs of their IoT projects, allowing more efficient use of resource management and optimization.
- **Connectivity and Communication**: Windows 11 IoT provides built-in support for diverse communication protocols, ensuring it becomes much easier to connect and make use of IoT devices. It includes the use of protocols such as MQTT and WebSocket, which help with the facilitation of seamless communication between devices and cloud services.
- **Security and Reliability**: Security is an integral aspect of IoT deployments, and Windows 11 IoT focuses on this by offering huge security features. It includes features like device authentication, secure boot, and hardware-based encryption to be sure of the confidentiality and integrity of data sent between devices.
- **Cloud Integration:** Windows 11 IoT helps provide seamless integration with various cloud platforms, allowing organizations to leverage the power of cloud computing for their IoT projects. It offers APIs and tools for the connection of IoT devices to cloud services, allowing for proper data storage, analytics, and remote monitoring abilities.

## Integrating Windows 11 with IoT Devices

IoT devices are pieces of hardware, including sensors, actuators, tools, appliances, or machines, that are configured for specific purposes and have the ability to transfer data over the internet or other networks. They can be incorporated into several types of equipment, including industrial machinery, environmental sensors, medical devices, and more. AI and machine learning are increasingly being used by IoT devices to give intelligence and autonomy to systems and processes, including autonomous driving, industrial smart manufacturing, medical equipment, and home automation. Many of these gadgets are small, low-cost, and microcontroller-based systems. In order to handle data on the IoT endpoint rather than using cloud-based methods, more on-device processing is still required due to network bandwidth, customer expectations about data privacy, and user experience. It can be beneficial to integrate Windows 11 with IoT (Internet of Things) devices to improve the functionality and automation of your Windows-based systems. Sensors, actuators, embedded systems, and smart appliances are all examples of IoT devices.

**Here are some concerns and steps for integrating Windows 11 with Internet of Things devices:**

- Start with the identification of the IoT devices you would like to get integrated with Windows 11. These devices may include cameras, sensors, machines, or any devices that can communicate over a network.
- Be sure that your Windows 11 device and the IoT device are linked to the same network. This can be either through Ethernet or Wi-Fi. IoT devices rely most times on network communication for the control and exchange of data.
- Be sure that your device and Windows 11 system are compatible as regards communication protocols and standards. Protocols often used for IoT communication include MQTT, CoAP, HTTP, and WebSocket.
- Take into consideration the use of IoT platforms and cloud services like Microsoft Azure IoT, AWS IoT, or Google Cloud IoT to control and interact with your IoT devices. These platforms offer tools for device management, data processing, and analytics.
- If your IoT devices need custom drivers or software development kits (SDKs), do well to have the needed software and drivers installed on your Windows 11 device. Certain IoT devices may need certain libraries or APIs for the sake of communication.
- IoT Protocols and APIs: There is a need for you to learn about communication protocols and APIS supported by your IoT devices. There may also be a need for you to produce custom scripts or

applications in languages like Python, C#, or JavaScript for the sole purpose of interacting with these devices.

- Implement quite a strong security measure for the protection of your Windows 11 system and IoT d devices. Ensure you make use of secure authentication, encryption, and access controls for the prevention of unauthorized access and data breaches.
- Data Exchange and Processing: Make a decision as to how data will be exchanged between Windows 11 and your IoT devices. You can make use of RESTful APIs, MQTT, WebSocket, or any other protocols to send and receive data. Make plans for data processing and storage on your Windows 11 system or cloud platform.
- Automation and Control: Design scripts on your Windows 11 device for the automation of tasks and control of IoT devices based on data obtained. For instance, you can make use of sensor data for the triggering of actions or alerts.
- Monitoring and Management: Implement monitoring and management solutions to monitor the status and health of the IoT devices. This includes keeping an eye on data, device connectivity, and firmware updates.
- Testing and Debugging: Ensure you test thoroughly your integration with IoT devices to be sure that data flows in a correct manner and that control actions are working optimally. Debugging tools and logging are quite essential for diagnosing issues.
- Scalability and Expansion: Take into consideration the scalability of your IoT integration. As you include more IoT devices, ensure that your infrastructure is able to handle the increased data volume and management of device needs.

It is possible to increase automation, make data-driven decisions, and have more control over your environment by integrating Windows 11 with IoT devices. Successful integration requires careful planning, security precautions, and a working knowledge of IoT protocols. Utilizing cloud-based IoT solutions can also make managing devices and analyzing data easier.

## IoT Core and Windows 11 IoT Enterprise

A feature upgrade for Windows 11 IoT Enterprise is Windows 11, version 22H2. Along with certain new and improved features beneficial for IoT scenarios, Windows 11, version 22H2 contains all prior cumulative updates to Windows 11 IoT Enterprise, version 21H2. Windows Server Update Services (including Configuration Manager), Windows Update for Business,

and the Volume Licensing Service Center (VLSC) all offer Windows 11 IoT Enterprise, version 22H2.

| Features | Description |
|---|---|
| Microsoft Pluton | Microsoft Pluton is a secure crypto-processor embedded into the CPU for security at the core to assure code integrity and the most recent protection with updates provided by Microsoft through Windows Update. It was designed by Microsoft and manufactured by silicon partners. Pluton safeguards passwords, identities, sensitive information, and encryption keys. Even if an attacker has installed malware or has complete physical possession, information removal is much more difficult. On hardware with Pluton-capable processors running Windows 11, version 22H2, Microsoft Pluton can be enabled. |
| Enhanced Phishing Protection | Microsoft Defender's improved phishing protection Microsoft credentials are protected by SmartScreen from phishing and risky usage. Windows 11 sign-in passwords are safeguarded by Enhanced Phishing Protection in addition to Windows security measures. |
| Smart App Control | By preventing harmful or shady apps, Smart App Control significantly increases security against malware, including new and emerging threats. Smart App Control also aids in the blocking of potentially unwanted apps, which include programs that can slow down your device, show unexpected advertisements, and offer you additional software you didn't want, or carry out other unexpected actions. |
| Credential Guard | Devices running compatible versions of Windows 11 IoT Enterprise (22H2) by default have Windows Defender Credential Guard enabled. Despite the fact that system administrators can still alter this enabled status, this affects the feature's default state in Windows. |
| Malicious and vulnerable driver blocking | When Smart App Control is enabled on a device and for fresh Windows installs, the vulnerable driver blocklist is automatically activated. |

| | |
|---|---|
| Security hardening and threat protection | For the Local Security Authority (LSA) process, enhanced security is supported in Windows 11, version 22H2, to guard against code injection that might compromise credentials. |
| Windows Update notifications | Windows Update user notifications can now be disabled during active hours. Organizations who want to stop Windows Update notifications from happening during business hours will find this setting to be especially helpful. |
| Start menu layout | Additional CSPs are now supported by Windows 11 IoT Enterprise, version 22H2, for modifying the start menu design. You can disable context menus and hide the app list using these CSPs. |
| Improvements to task manager | Each page now has a new command bar that provides access to frequently used functions. The system-wide theme set in Windows Settings will automatically be used by Task Manager. Added an efficiency mode that enables you to restrict a process's use of resources. |
| Windows accessibility | Additional accessibility enhancements for persons with impairments are included in Windows 11, version 22H2, including system-wide live captions, Focus sessions, voice access, and more realistic voices for the Narrator. |
| High-Efficiency Video Coding (HEVC) support | Support for High-Efficiency Video Coding (HEVC) is currently available as of Windows 11, version 22H2. HEVC is made to make use of some newer devices' hardware capabilities to enable 4K and Ultra HD content. Software support is available for devices that lack hardware support for HEVC videos, however, the playback experience may differ depending on the video resolution and the functionality of your device. |

## Prototyping IoT Solutions with Windows 11

Using Windows 11 to prototype Internet of Things (IoT) solutions can be a useful strategy for developing and testing your concepts before implementing them in a real-world setting. You may quickly and effectively construct IoT prototypes with the tools, environments, and resources provided by Windows 11.

**Here is a step-by-step tutorial for using Windows 11 to prototype IoT solutions:**

- Clearly state the goals and objectives of your IoT project. The problem you are trying to solve, and the data or device that will be involved. The need for a clear vision for successful prototyping cannot be overemphasized.
- Choose the IoT hardware parts that suit your project. This can include microcontrollers such as Raspberry Pi, Arduino, sensors, actuators, and communication modules.
- Install the IoT development extension for Visual Studio like Windows IoT Core Project Templates and Windows IoT Core Project System extensions. These extensions offer templates and tools for the building of IoT applications.
- Make use of Visual Studios to design a new IoT project depending on the hardware platform you have chosen. Windows 11 supports diverse IoT platforms such as Raspberry Pi and Intel-based devices.
- Produce the software for your IoT solution. This may have to do with you writing code in languages like C#, Python, or JavaScript depending on your hardware and project requirements.
- Interact with the IoT hardware by making use of libraries and APIs offered by the hardware manufacturer or community-supported libraries. This includes having to read sensor data, control actuators, and manage device communication.
- Make a decision on how your data will be processed and analyzed. You can choose to make use of Windows 11 built-in capabilities or connect to a cloud-based service for the storage and analytics of data.
- If your IoT solution needs a user interface, create and build it with the use of Windows 11's UWP (Universal Windows Platform) application development tools. You can design various interfaces for both desktop and mobile devices.
- Ensure you put your prototype to test thoroughly so that you are sure it's functioning as it should. Debug any problems you encounter and get your code refined as needed.
- Set up the needed network, implement adequate security measures, document the architecture of the prototype, and then prepare it for deployment.

You can quickly create proof-of-concept projects and explore the capabilities of the Windows IoT ecosystem by prototyping IoT solutions with Windows 11. To ensure successful prototyping, keep in mind that IoT development

frequently requires a combination of hardware and software expertise. As a result, working with professionals in both fields might be helpful.

## Activity

1. What are IoT devices? Mention 3 IoT devices.
2. Integrate Windows 11 with your IoT device.
3. Differentiate between IoT core and Windows IoT enterprise.
4. What are the steps to prototyping IoT solutions with the use of Windows 11?

# CHAPTER 46
# AUTOMATING TASKS WITH TASK SCHEDULER

Using the Windows Task Scheduler tool, you can create scheduled activities that execute upon boot-up if you frequently use particular programs in Microsoft Windows 11 and get weary of opening them after a shutdown or reboot. Don't know how to create a scheduled task in Windows 11 using the more complex ways or don't want to learn them? This chapter is for you! Powerful automation features are built into your Windows 11 PC so you can complete more work in less time. Additionally, automation frees you up to concentrate on coming up with fresh content, programs, or design concepts. Your go-to program for basic to advanced automation including third-party apps, web browsers, batch files, and other items is the Windows Task Scheduler application. It has long operated within the Windows operating system. On a Windows 11 PC, though, using the tool is incredibly simple and natural. Up until the most recent version of Windows 11, the Windows Task Scheduler utility has been a part of Windows NT operating systems including Windows XP, Windows 2000, etc. The utility allows the PC OS to automatically execute a number of programs and services. For instance, be aware that an automated task is responsible for the Windows 11 PC's OS upgrades and security patch downloads.

Similar to how the Task Scheduler app is responsible for the automated game saving provided by Xbox Live, the program runs the XblGameSave Standby Task when your PC is inactive. There are numerous other automated Windows tasks, like CHKDSK ProactiveScan, CryptoPolicyTask, BitLocker Encrypt All Drives, and others. The best feature of Windows 11 is the ability to schedule automatic tasks involving third-party apps using the Task Scheduler tool. As a result, you may develop powerful automation on a Windows PC, such as having the Task Scheduler automatically open

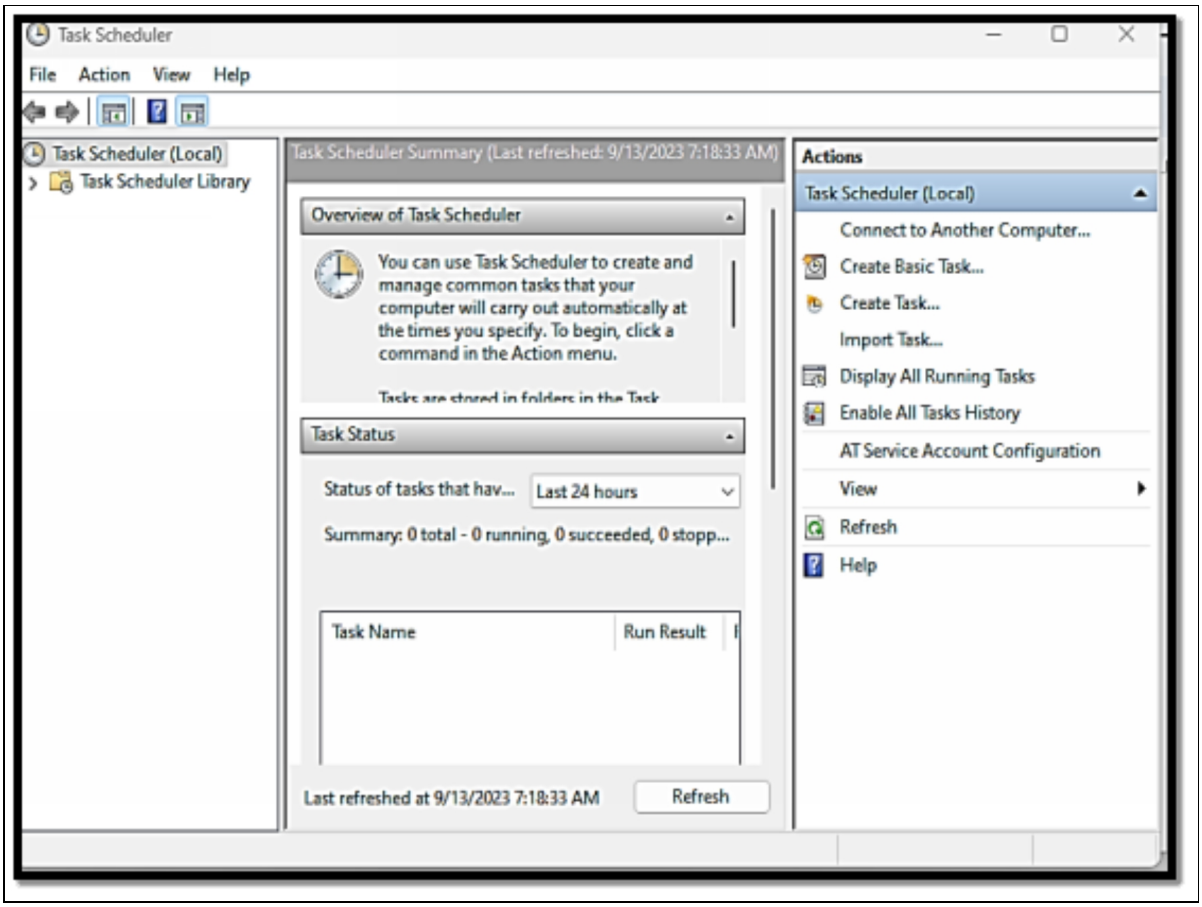
the Outlook app and send a crucial business email at a specified time and date.

**Below is a comprehensive list of functionalities that can be found in the Task Scheduler app;**

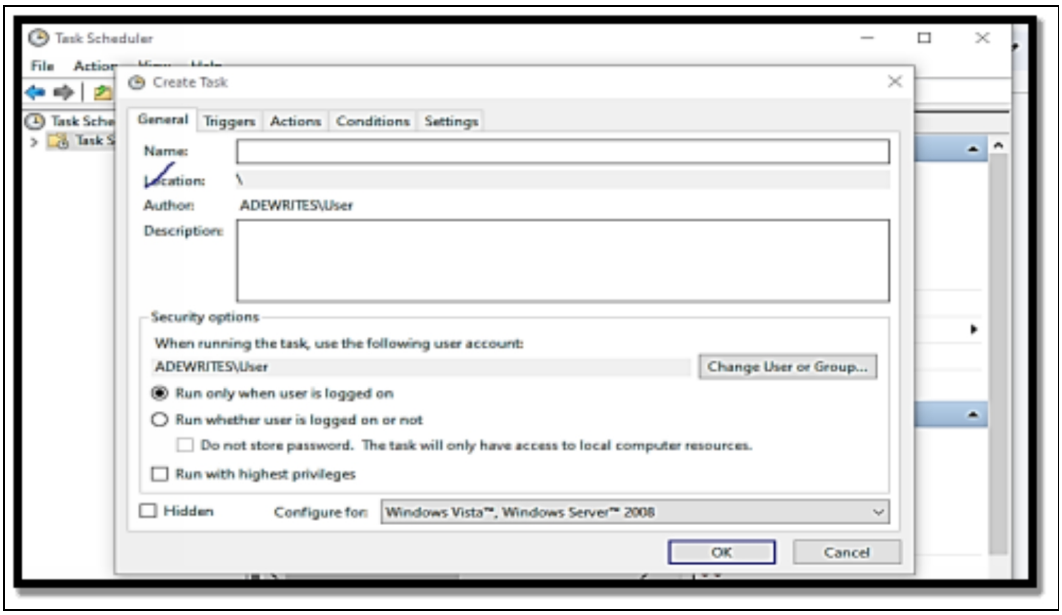
- You can choose to launch an application, service, or batch file at a certain time.
- You can send email messages or texts to someone instantly with the use of a certain program.
- The tool can send out task reminders and notifications.
- You can control the security of the Windows PC remotely. For instance, whenever anyone attempts to open a certain business app and copy files to external storage, an advanced Windows scheduled task can put an end to this.
- There is no need for you to open the needed application manually after each PC starts again or shuts down. The Task Scheduler can help with the opening of applications.

**Follow the steps below to open Task Scheduler;**

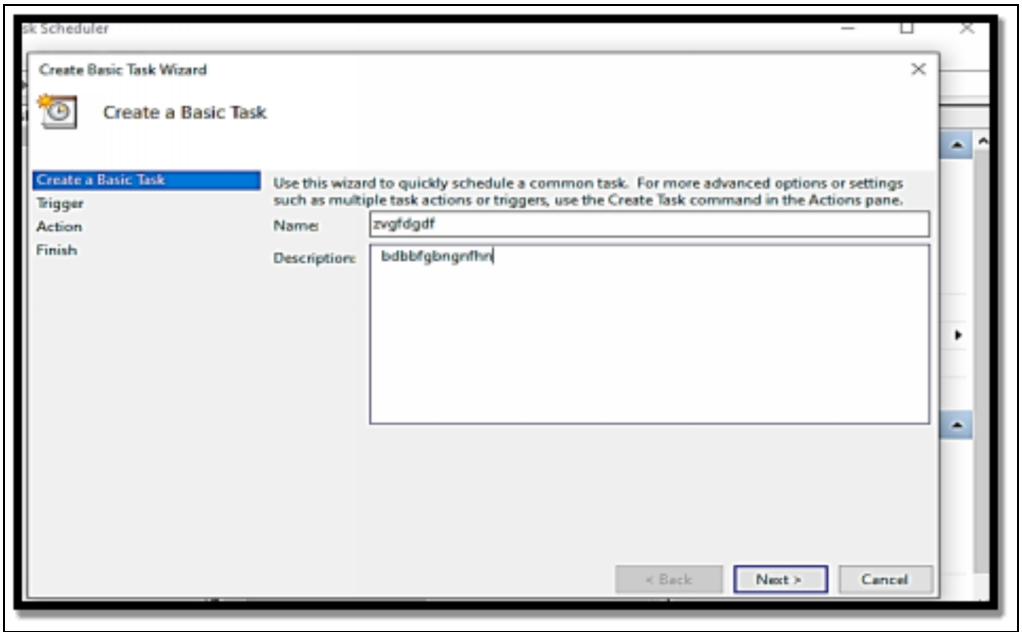
- Launch **Start**
- Locate **Task Scheduler**, and choose **the top result to get the application opened.**



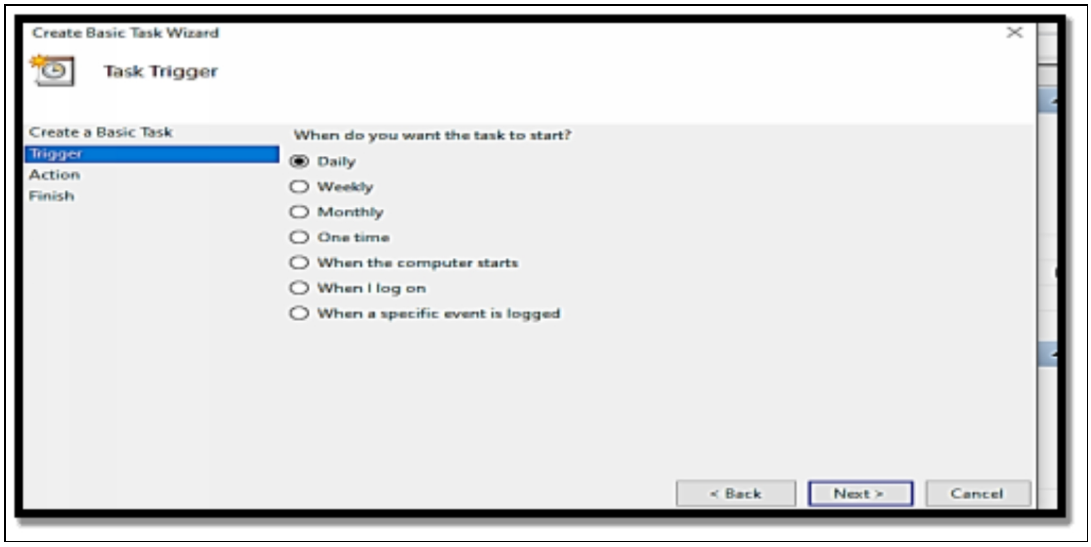

- Right-click the **Task Scheduler Library branch** and then pick the **Create Task.**



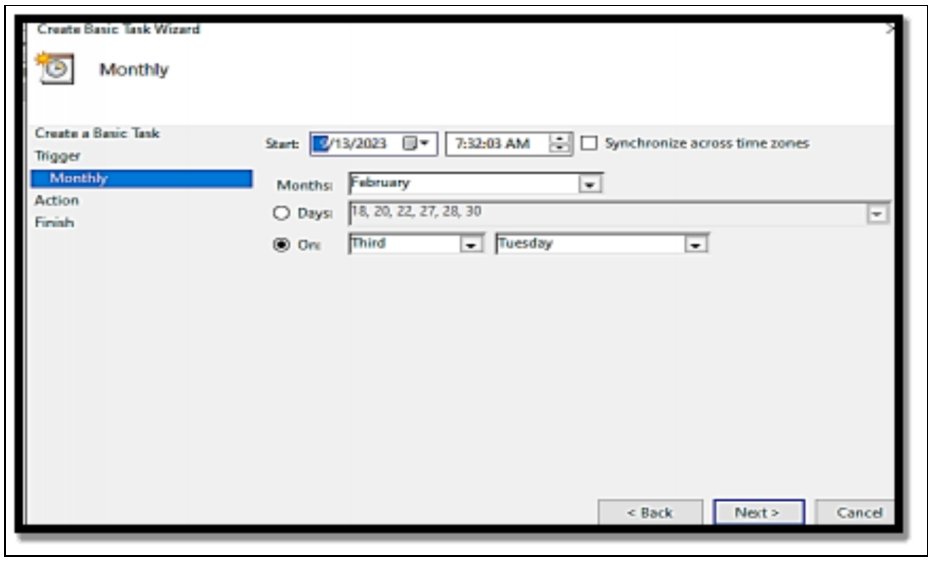
- Insert a **name for the folder.**
- Choose t**he OK button.**
- Expand the **Task Scheduler Library branch,** and choose the **Create Basic Task option.**
- Insert a short descriptive name for the task, for instance, Notepad Launcher in the Name field.
- Compose **a description for the task in the Description field.**




- Choose **Next.**
- Choose the **Monthly option.**
- Choose the **Next button.**



- Indicate when you would like the Task to start running and the time with the use of the Start setting.
- Choose **the months of the year to execute the task with the use of the Monthly drop-down menu.**
- Indicate the days the task will run with the use of the Days or On drop-down menus.




- Choose the **Next button.**
- Choose the **Start a program option** to open an application, execute a command, or run a script file.
- Choose the **Next button.**
- Indicate the path for the application in the Program/script field.
- Indicate the arguments to execute the task with instructions in the Add arguments field.
- Indicate the folder in which the program will commence in the Start in the field.
- Choose the **Finish button.**

## Creating Advanced Scheduled Tasks

**To create an advanced task setting with the use of the Task Scheduler on Windows 11, follow the steps below;**

- Open **Start.**
- Locate **Task Scheduler** and choose **the top result in order to get the app opened.**

- Right-click the **Task Scheduler Library branch**, and choose the **New Folder option.**
- Insert **a name for the folder.**
- Choose the **OK button.**
- Expand the T**ask Scheduler Library** and choose **the MyTasks folder.**
- Choose **the Action menu** and choose the **Create Task option.**
- Insert **a short descriptive name** for the task in the Name field.
- Compose **a description for the task in the Description field.**
- In the Security options, set the administrator account to execute the task.
- Check the Run with the highest privileges option if the task needs some elevated privileges.
- Choose the **Triggers tab.**
- Choose the **New button.**
- Make use of the Begin the Task drop-down menu to choose one out of the many triggers.
- Indicate when the task ought to commence running and the time with the use of the Start setting.
- Choose t**he Month option from the left side.**
- Choose **the months to execute the task** with the use of the Months drop-down option.
- Indicate the days to execute the task with the use of Days or On drop-down menus.
- In the Advanced settings, choose options to delay, repeat, stop, and also have a task expired.
- Check the **Enabled option.**
- Choose the O**K button.**
- Choose the **Action tab.**
- Choose the **New button.**
- Choose the **Start a program option** with the use of the A**ction drop-down menu.**
- Beneath the Settings option, in the Program/script field, indicate the path for the application.
- Indicate arguments to execute with the task in the **Add arguments field.**

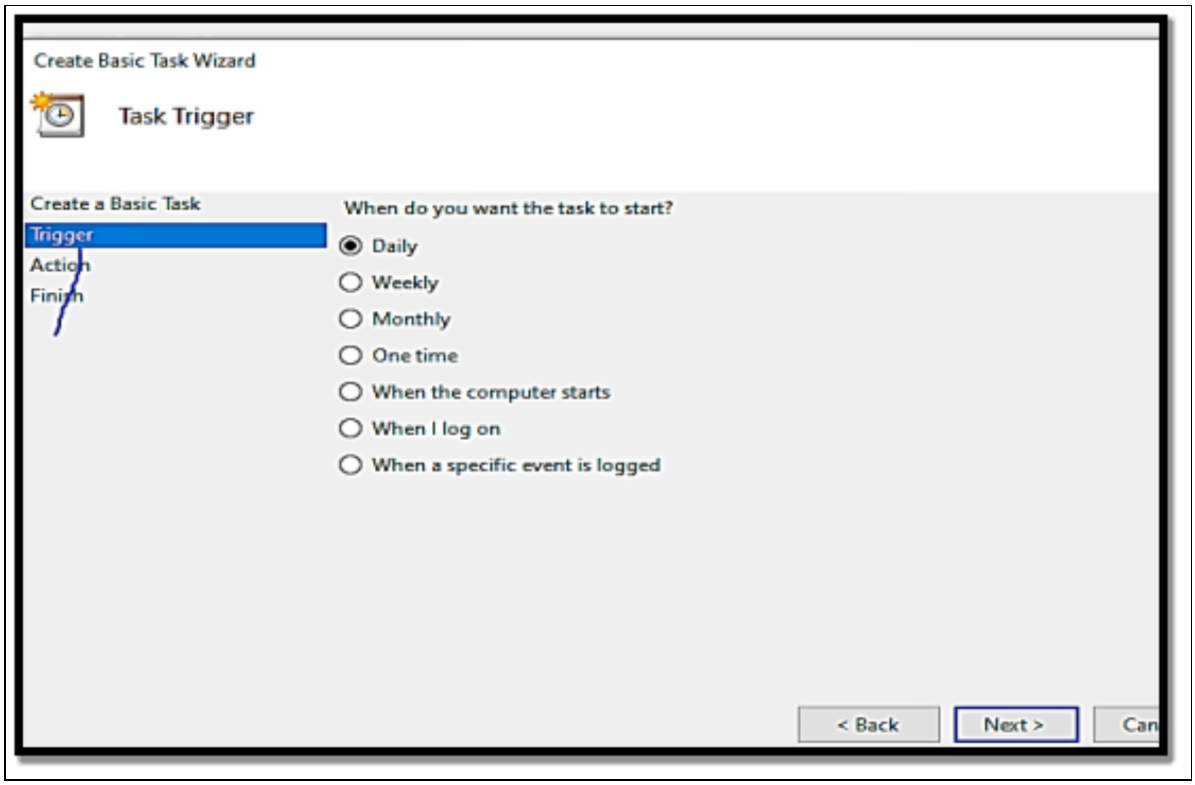
- Choose the folder in which the program will commence in the Start in field option.
- Choose the **OK button.**
- Choose the **Conditions tab.**
- In the Conditions tab, you don't need to alter the settings for a basic task. Nevertheless, you ought to ensure the Power settings are configured as needed.
- Choose the **OK button.**
- Choose the **Settings application.**
- The Settings application includes more options that will greatly impact the task.
- Choose the **OK button.**

## Using Triggers and Actions Effectively

You may automate numerous operations and procedures on your computer by using triggers and actions in Windows 11's Task Scheduler. You can schedule activities to execute at particular times or in reaction to particular events using the built-in Windows program known as Task Scheduler.

**Here is how to use Windows 11's Task Scheduler's triggers and actions productively:**

- Open **Task Scheduler and create a basic task.**
- Choose **your preferred trigger.** Triggers help to determine when your task will run.




- Based on the trigger you decide to choose, there will be a need for you to configure certain settings like start time, pattern of recurrence, and event details.
- Choose **an Action.** This helps to state what the task will do when it is triggered.
- Configure A**ction settings.**
- **Review and Finish.**

## Monitoring Task Scheduler Logs

You may keep track of scheduled tasks, their execution status, and any issues or warnings that might appear while a job is being executed by checking the job Scheduler logs in Windows.

**Here's how to successfully monitor Task Scheduler logs:**

- Access the **Task Scheduler.**
- Check **Task History.**
- Choose **a Task.**
- Check **out the history tab.**
- Check the **Execution Status.**

- Check for the **Task details.**
- Check **out also for the Action menu.**

## Activity

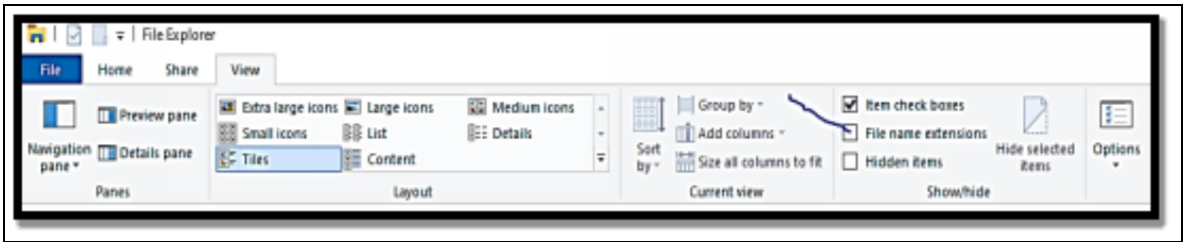
1. Create an Advanced scheduled task.
2. What is the function of Trigger and how effectively can it be used?
3. Monitor a task in your task scheduler log.

# CHAPTER 47
# EXTENDING WINDOWS 11 WITH EXTENSION

File Explorer on Windows 11 by default conceals the extensions for well-known file types for some reason, but this post will show you how to do so in a few different methods. The three or four letters that follow the period at the end of the name—the file extension—indicate the type of file format. My-notes.txt, My-document.docx, etc. are a few examples. Although saving the file extensions is no longer necessary, they provide additional visual cues for immediately determining the file's format. When constructing a script or batch file, it also makes it simpler to switch compatible extensions as needed, for as from.txt to.bat.

**Below are steps that should be taken in order to see file extensions in Windows 11;**

- Open **File Explorer on Windows 11.**
- Choose the **View menu button in the command bar.**




- Choose the **Show submenu and click on the File name extensions option.**

Upon the completion of the above steps, the file extension should now be visible to you.

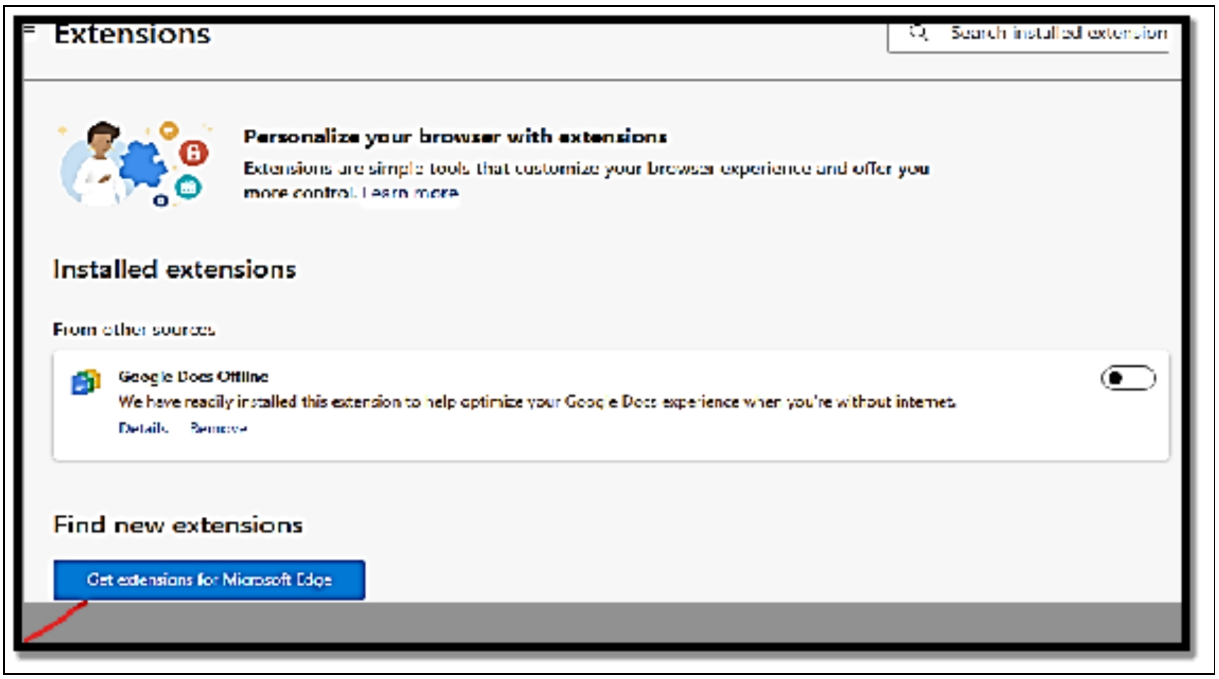
## Microsoft Edge Extensions

Microsoft Edge is a web browser developed by Microsoft. It was introduced first in 2015 as a replacement of Internet Explorer and it

was also made the default web browser in Windows 10 and later versions of the Windows operating system. Microsoft Edge can also be used on other platforms which include macOS, Android, and iOS. Microsoft has focused on optimizing Edge for speed and performance. It is created to load web pages swiftly and in an efficient manner, ensuring it becomes competitive among other web browsers. This unique web browser is well synchronized with various Microsoft services like OneDrive, Microsoft Office Online, and Cortana (Microsoft's digital assistant). This integration enables a seamless experience when making use of Microsoft products and services. Microsoft Edge has features that improve user security and privacy. To prevent websites and advertisers from tracking your online behavior, it enables tracking prevention. It also comes with Microsoft Defender SmartScreen, which blocks downloads and webpages that can be hazardous. With the help of its Immersive Reader mode, Microsoft Edge offers a distraction-free reading experience on websites. Additionally, it has text-to-speech capabilities and allows you to set your own reading preferences. Microsoft Edge is made to work with a variety of websites and web-based apps. The vast majority of websites on the internet may be browsed with it because it supports current web technologies. Browser extensions, which are optional tiny programs that can be added to a browser to increase functionality, are supported by Microsoft Edge. The Microsoft Edge Add-ons Store offers a selection of extensions for productivity, security, and other purposes that users can install.

**In the section below, you will learn how to find an extension and add it to Microsoft Edge;**

- Open **Microsoft Edge** and choose **the three dots > Extensions > Manage extensions and choose Get Extensions from Microsoft Store.**




- Choose t**he extension you would like to add and then select the Get button.**
- At the prompt showing permissions required by the extension, take a careful review of the permissions and then choose the **Add extension button.**
- The prompt that follows will confirm that the extension has been added.

**To have an extension added to Microsoft;**

- Go to the **Chrome Web Store.**
- Choose **Allow extensions** from other stores in the banner at the top of the page.
- Choose the extension you would like to include and choose **Add to Chrome**.
- At the prompt displaying permissions required by the extension, review the permissions in a careful manner and choose **Add extension**. You will then see a final prompt that will confirm the extension has been added.

**To remove an extension from Microsoft Edge, follow the steps below;**

- Open **Microsoft Edge** and right-click on **the extension icon close to the address bar.**
- Choose **Remove from Microsoft Edge.** You can also remove extensions by going to **Settings and More> Extensions**, then choosing **Remove beneath the extension you would like to remove.**
- You will then see a prompt requesting that you confirm that you would like to remove the extension, choose the Remove button for the confirmation.

Microsoft Edge is unquestionably quick, easy, and portable. It includes several extra capabilities, including PDF, eBooks, and Flash. Even though it only offers a small selection of extensions, the ones it does have are excellent. Additionally, installing and downloading Edge Extensions is simple. You can use the various free add-ons offered for this browser if you enjoy using Microsoft Edge and wish to expand its feature set.

**Some of the top Microsoft Edge extensions that you absolutely need to have are included in the section below.**

- **Last pass:** Lastpass can be described as one of the best Microsoft Edge extensions that save all of your passwords, ensuring it becomes easier for you to remember them. The software helps with the creation of an autopilot for all your passwords. It takes away all of the hurdles enabling you to return to the things that are of utmost importance to you. Once your password has been saved, you can always gain access to it whenever you want. It also becomes much easier for you to log in swiftly and in a very convenient manner. Also, it ensures that your online shopping experience becomes as easy as possible as it helps with the filling of your profile with all of your payment and shipping details instantly. LastPass produces very powerful passwords with the use of the integrated password generator. It helps with the creation of long, arbitrary passwords that help to protect you against hackers. Furthermore, it also saves digital copies of your insurance cards, Wi-Fi passwords, memberships, and lots more.

- **AdBlock Plus**: Ads can be frustrating, especially when one suddenly appears as you are scrolling through a website reading your favorite article. Many of these advertisements are intrusive and dangerous to your computer. Although adverts are the primary means of income for the majority of websites, they are still necessary for the websites to function. Therefore, buy AdBlock Plus if you want to stop annoying adverts while still supporting websites that have non-intrusive ads. The majority of the bothersome adverts on the websites viewed are blocked by one of the greatest Microsoft Edge extensions. This well-known ad blocker also eliminates web trackers, social media sharing options, and malware risks from harming your computer. The best part is that you can include personalized rules to restrict adverts and even create a whitelist of specific domains that can view ads.
- **Mouse Gestures**: Mouse Gestures is another amazing extension for Microsoft Edge. With it, you are able to do the basic browsing procedures by simply right-clicking and then making use of the mouse gestures. For example, you can right-click and then hold, and then drag the mouse down and towards the right to close the tab that is opened. As an alternative, you can go back to the last page by dragging the mouse from the right to the left. The home page, a copy of the current page in a new tab, or simply closing all tabs to the right or left are all options in addition to using the mouse to reopen a closed tab. Holding the right click button while making a left click or vice versa are additional movements. This is to carry out an immediate action. Since it covers a similar amount of ground as your mouse does when you scroll up or down, it moves much more fluidly.
- **Save to Pocket**: With the use of save to pocket, you are able to read/view a website such as articles, videos, or news stories, and be able to watch at a much later date. These downloaded contents can be seen in a fascinating, and an easy to read format on any of your devices (phone, computer, or tablet) later. With the use of Microsoft Edge, you can save just about a page on the internet with just a click. Also, you can

choose to read all that you have saved on your devices with the use of the pocket app. Furthermore, all the contents you must have downloaded will be available for reading or viewing in a pristine clean format that is also quite easy to see. You are also able to organize the saved recipes, official content, or any other details for effective planning of a trip with the use of the application. While it helps with the creation of audio files for your downloaded articles to be heard while you are on the go, it also allows you to locate personalized stories that have been suggested by the application.

- Office Online is a very useful application and extension for people to make use of the office quite frequently. Making use of this application, you are able to design, edit, and view office files in your browser. You can gain access to the extension directly from Microsoft Edge's toolbar wherein you will be able to easily access your Office files irrespective of the fact that are on your computer or saved online. The extension can also open files that are saved in applications like OneDrive and the business version of OneDrive. It usually is loaded with all of the features of Word, PowerPoint, Sway, Excel, and OneNote directly on your browser without the installation of the MS Office software.
- **Microsoft translator:** There are so many websites that the language used in creating it may not be English. In such cases, there is a need for a very powerful translator to help with the translation of the content with ease and swiftly for your own convenience. Microsoft Translator for Microsoft Edge is just one of the best extensions that are very simple yet handy and also aids the translation of text and pages in a seamless manner. This extension is quite useful, especially for websites that are in foreign languages used by researchers, bloggers, and journalists. It helps to translate a whole page into your preferred language. As an alternative, you can also choose an aspect of the page to translate inline into any of the 60 or more languages that the application supports. The icon is positioned on the bar of the browser so that all you need to do to make

use of it is just to select the icon and it will have the page translated instantly.

We can anticipate the addition of further extensions soon because Microsoft Edge is still a fresh and developing product. These are some of the top Microsoft Edge extensions at the moment, and they are quite helpful for blocking intrusive adverts and trackers, translating other languages, and downloading information for later use. Choose one to suit your needs and improve your Microsoft Edge browsing experience.

## Developing Extensions for Windows 11

The Internet browser has provided methods to add third-party add-ons to their functionality since the early days of the World Wide Web. Internet Explorer, the first web browser for Windows, allowed ActiveX controls, a potent but notoriously unsafe mechanism to give the browser additional abilities. Modern browsers, on the other hand, employ extensions to add new features safely. Extensions are created with JavaScript and HTML and deployed through a controlled store. For Google Chrome, third-party developers have created a robust ecosystem over the past ten years. The most popular categories include password managers, ad blockers, writing tools, and research tools, but there are a surprising number of extensions available. The exclusions typically require access to a Google account or to Google services, however, the majority of those extensions function in Microsoft Edge without modification, and many of them have been changed for sale in Microsoft's Edge Add-ons store.

A Google Chrome extension can be slightly modified by developers and uploaded to the Edge Add-ons marketplace. At https://microsoftedge.microsoft.com/addons, you can search for a specific extension or browse the entire selection by category. If Microsoft doesn't offer the extension you require, there's a good chance Google's Chrome Web Store will. You must turn on the Allow Extensions from Other Stores setting in Edge's Extensions page in order to install extensions from that source.  You may manage

installed extensions there as well. You can instantly enable or disable any installed extensions by using the on/off switch adjacent to them.

Although the majority of extensions are created to operate continuously, you might have specialized add-ons that you only activate when necessary. Each extension's button by default appears on the Edge toolbar to the right of the address bar. For extensions that need interaction to work their magic, that is ideal. Consider reducing clutter for extensions that operate primarily in the background by right-clicking the button and selecting the Hide from Toolbar option. (To reposition the button, select More Actions > Extensions and then Show in Toolbar from the extension's More Actions menu.)

**In the section below, you will learn about the various steps that you can use in building an extension;**

- **Step 1:** Create a manifest .json file: Every extension package ought to have a manifest .json file at the root. The manifest helps with the provision of details of your extension, the extension package version, the extension name, and description, and so on.
  **The code below shows the basic information that you will need in your manifest.json file;**
  { "name": "NASA picture of the day viewer", "version": "0.0.0.1", "manifest_version": 3, "description": "An extension to display the NASA picture of the day." }
- **Step 2:** Add icons: Commence with the creation of the icons directory in your project to save the icon image files. The icons are used for the background image of the button that users choose to open the extension.
  - For icons, it is best you make use of PNG format, but you can also choose to make use of BMP, GIF, ICO, or JPEG formats.
  - You can also use images that are 128 x 128 px, which can be modified by the browser if need be.

Next, include icons in the manifest .json file. Have the manifest .json file updated with the icon information so that it will be a perfect match to the following code. The PNG files listed in the following code are available for download in the file mentioned earlier.

{ "name": "NASA picture of the day viewer", "version": "0.0.0.1", "manifest_version": 3, "description": "An extension to display the NASA picture of the day.", "icons": { "16": "icons/nasapod16x16.png", "32": "icons/nasapod32x32.png", "48": "icons/nasapod48x48.png", "128": "icons/nasapod128x128.png" } }

- Step 3: Open a default pop-up dialog: You are now able to create an HTML file to execute when the user opens your extension. Design the HTML file with the name popup.html in a directory named popup. When users choose the icon to open the extension, popup/popup.html is shown as a modal dialog. Include the code from the following listing in popup.html to show the stars' image;

  <html lang="en"> <head> <meta charset="UTF-8" /> <title>NASA picture of the day</title> </head> <body>  <img src="/images/stars.jpeg" alt=" Display the stars image" />  </body> </html>

**Make sure that you include an image file in the folder of the images. The directories of your project ought to look like the structure below;**

├── manifest.json ├── icons │ ├── nasapod16x16.png │ ├── nasapod32x32.png │ ├── nasapod48x48.png │ └── nasapod128x128.png ├── images │ └── stars.jpeg └── popup └── popup.html

# Activity

1. Add an extension to your Microsoft Edge browser.
2. Develop an extension of your own for Windows 11.
3. Mention three (3) third-party extensions you can use with Microsoft Edge.

# CHAPTER 48
# ENHANCING BATTERY LIFE AND POWER MANAGEMENT

The current portable PC is jam-packed with hardware engineering marvels that have reduced the size of potent components to previously unheard-of levels. Similar efforts on the software side have been successful in extending the battery life of those designs. As a result, you may now use a Windows PC while traveling to complete tasks that are almost exact replicas of those you can complete at your desk. However, the battery life suffers as a result of all that processing power. Additionally, achieving the ideal balance relies on your goals. Sometimes you need your PC's full power, especially if you have to complete a task that requires a lot of resources quickly and you know you'll be back near AC power long before your battery is at risk of dying. In other situations, when there is a light workload and you know it will be a while before you can recharge your smartphone, you want to extend the battery's life as much as you can. Any action you take to increase a portable device's battery life helps you prevent having to stop working because your battery got drained.

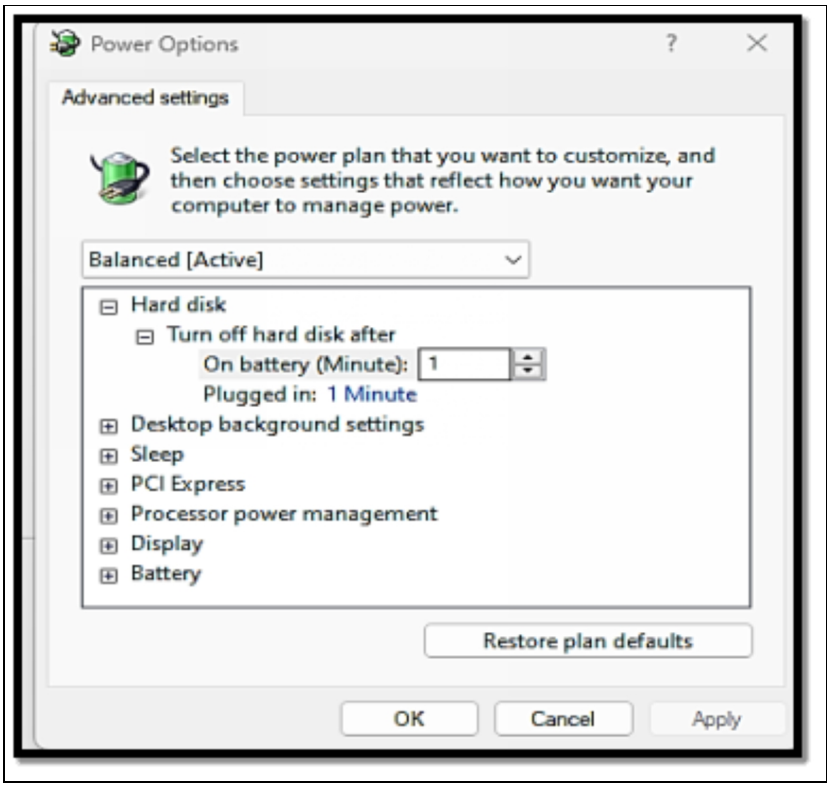
You can modify how Windows utilizes the battery during the current session using some extra options on the Power & Battery page. You can select one of three options from the Power Mode menu on the Power & Battery page in Settings: If you wish to change the performance-battery ratio on PCs running the original version of Windows 11, choose Best Performance or Best Power Efficiency.

## Advanced Power Options

The term "Advanced Power Options" in Windows 11 refers to a group of programmable settings that let you fine-tune how your computer handles power and energy consumption. Users now have more control over how their system works in a variety of power conditions, such as when it is plugged in or operating on battery

power, thanks to these advanced settings. In order to improve the performance of your computer, increase laptop battery life, or alter power settings for particular situations, having access to these options can be helpful.

**Below are some of the important features and settings that you can locate in Advanced Power Options;**




- **Processor Power Management**: These settings enable you to manage the minimum and maximum processor state when you are either plugged in or running on battery. Modifying these values can have an impact on the performance and power consumption of the PC.
- **System Cooling Policy**: You are able to choose between Active and Passive cooling policies. Active ensures the CPU's fan is running well to keep lower temperatures, while Passive enables the system to throttle performance if need be in order to avoid overheating.
- **Maximum Processor Frequency**: This configuration enables you to reduce the maximum CPU frequency as a percentage of

its maximum capabilities. It is pretty helpful for the reduction of power consumption and generation of heat when having to run on battery power.

- **Display Settings**: Advanced Power options give room for the specification of the screen brightness levels when using the battery and when plugged in. Reducing brightness can greatly extend battery life on laptops.
- **USB Settings**: You can set USB selective suspend settings to enable or prevent individual USB devices from getting into low-power states. This can aid the management of power consumption for USB peripherals.
- **PCI Express Settings**: These settings manage the power management of PCI Express (PCIe) components, like graphics cards and other expansion cards. You can also decide to enable or disable PCIe Link State Power Management.

In Windows 11, finding Advanced Power Options usually entails going to the Power & Sleep settings or the Power Options area of the Control Panel. Users can use these options to customize the power management of their computer to meet their unique requirements, whether they are maximizing performance, prolonging battery life, or striking a balance between the two.

## Battery Saver Mode and Power Plans

Users can customize the power usage of their devices in Windows using a wide range of power settings to suit their individual demands. For PCs and laptops, this enables you to maximize performance while saving energy.

**Users of Windows have access to three different power plans: High Performance, Power Saver, and Balanced. Every strategy has a special function:**

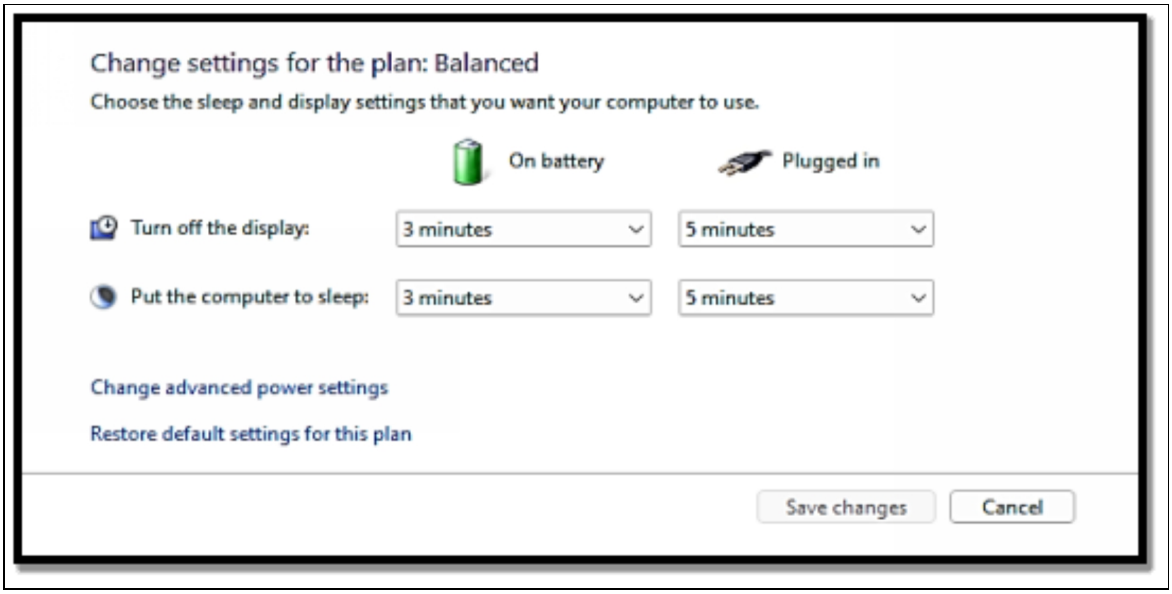
- **Balanced**: This can be described as the recommended plan for almost all users. It helps to balance performance with power conservation and modify settings in a rather dynamic way depending on the usage of the system.

- **Power Save**r: This option is usually used for laptops running on battery power. This plan helps to prioritize energy efficiency over performance. It limits the speed and brightness of the battery in order to prolong the life of the battery. It is worth noting that when making use of this plan, performance will be greatly reduced.
- **High Performance**: This option is ideal for resource-intensive tasks such as gaming or video editing, this plan helps to focus on increasing performance. Nevertheless, it may consume more power and is best used with desktops connected to a source of power.

For laptops, the balanced power plan is highly recommended. While Power Saver might be quite tempting because it helps to increase battery life, it greatly reduces the performance of the laptop. The Balanced plan, on the other hand, offers a good balance between performance and energy savings, which is quite important for on-the-go productivity. If you make use of your desktop for tasks that are quite demanding like video editing, and gaming, or you execute resource-intensive software, change to the High-Performance plan. Nevertheless, the balanced power mode can aid the saving of energy if you do not make use of your PC for demanding tasks.

**If you would like to alter the power plan,**

- Type the following into the search file on the taskbar at the bottom of the screen; “Control”. Once done, the control panel will be opened.
- Choose **Power options**.
- Beneath the preferred plans section, choose **the power plans** that are available for your PC. If there is a need for you to personalize the plan choose change plan settings. You can choose to design a custom plan to tailor it to your unique preferences.



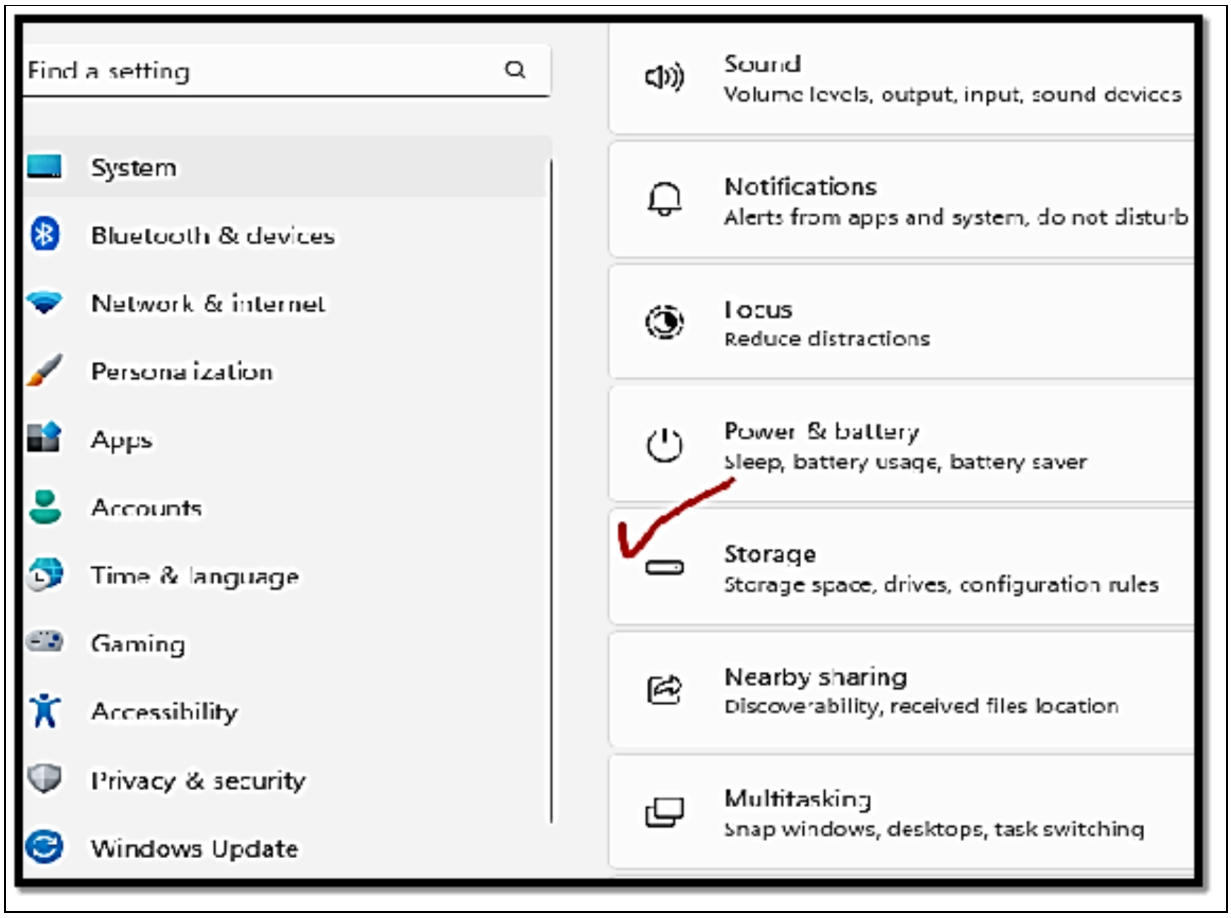

- To get this done, choose "**Create a power plan"** from the list on the left-hand side.

- You can choose what your buttons do like shut, sleep, or hibernate. To get this done, choose what the power buttons do from the list on the left.
- You can modify when your computer goes to sleep more, or when the screen goes off. To get this done, choose **Change** when the computer sleeps from the list on the left.

## Managing Background Process and Battery Drain

Some applications allow you to control background activity, allowing you to choose what they can do when they're running in the background but not being actively used. Background-running apps can sync data, send and receive notifications, and keep themselves current. You can alter the option for programs that permit background running if you discover that they consume a lot of battery power.

- Choose the **Start button**, then choose **Settings > System > Power & Battery>**




## Battery usage.

- For an application that enables you to manage the kground activity, choose **More options (three vertical dots) > Manage background activity.**

- **On the settings page for that application, alter the setting to Let this app run in the background. Below is a summary of each of the options;**
    - **Always**: The app is usually enabled to run in the background- get information, send notifications, and stay up-to-date even when it is not being actively used.
    - **Power optimized (recommended)**: Windows will make a decision on what is best to help save the most power while still enabling the application to get notifications and updates in a periodic manner. This option might reduce an application that makes use of more power.
    - **Never**: When you notice that you do not actively make use of an application, it won't run in the background. You will not get any notifications or updates for the application but this will help conserve power effectively.

Note however that Desktop applications will not be displayed in the App list. To enable or black desktop apps, make use of the settings in those applications. What distinguishes a desktop app from a mobile app? The majority of the time, desktop applications are downloaded from the Internet or using some sort of media (such as a CD, DVD, or USB storage device). Unlike web-based apps, which run in the cloud, they are normally started using an.EXE or.DLL file and run on your device. Additionally, desktop programs are available on the Microsoft Store.

## Activity

1. Make a choice of your preferred battery plan.
2. Manage the apps running in the background on your device to reduce battery drain.

## Conclusion

In a world where more and more people are returning to using PCs in their daily lives, Microsoft felt it was critical to release a new operating system designed from the ground up for working from home, while also catering to a new generation of people who have grown up with smartphones and tablets as their primary "computer." Windows 11 focuses on three important areas: a new and modern user interface designed to make using Windows easier, new features and improvements aimed at increasing productivity, and a renewed emphasis on the Microsoft Store. The majority of the top-level user interfaces have been refreshed with new animations, iconography, and noises. Everything from the Start menu and Taskbar to the context menus and in-box apps has been modified to match the rest of the new Windows 11 design. One of Microsoft's priorities with Windows 11 has been to simplify and declutter the user experience (UX). Microsoft is attempting to make the Windows UX more user-friendly for casual PC users who are more comfortable with newer OS experiences like iOS and Android, but this comes at the expense of simplifying some common features or behaviors that some old-school Windows die-hards may find difficult to adapt to.

The good news is that Windows 11 will be a terrific release for individuals who prefer elegance over complexity. It's a joy to use, with an almost perfect fluid UX. Windows 11 is a breath of fresh air for people who like the spectacle of software design, as well as a fantastic release for those who prioritize productivity enhancements and "getting to work" over anything else. Windows 11 is now generally available as an update for qualified Windows 10 PCs. Microsoft is taking a controlled and gradual approach to the distribution, which means that not everyone will be offered the update right away. When your PC is ready, a large popup will show in Windows Update, allowing you to start the download and installation procedure, and Windows will handle the rest.

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