NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

SkillsFuture Career Transition Program

Cloud Infrastructure Engineering

Operating System - Windows

Nanyang Technological University
Skills Union

Course Content

- Explore the basics of Windows OS
- Differentiate between Windows OS and Windows Server
- Identify structure of drives for installed apps and program files
- Set environment variable in Windows
- Use Windows Services Manager to start, stop, and disable Services

Schedule

Duration	Activity	Details
7:15pm - 7:30pm	Part 1 - Windows Summary	
7:30pm - 7:45pm	Part 2 - Windows History	
7:45pm - 8:00pm	Part 3 - Windows Server	
8:00pm - 8:10pm	Break	
8:15pm - 8:30pm	Part 3 - Windows vs Windows Server	
8:30pm - 8:50pm	Part 4 - Windows for Programming	
8:50pm - 9:50pm	Assignment briefing + Assignment	

Recap

- Network Communication Protocol
  - TCP
  - UDP
  - HTTP
  - FTP
- Network Management Protocol
  - ICMP
  - SNMP
- Network Security Protocol
  - HTTPS
  - SSL/ TLS
  - SFTP

Recap

- Network Security
- Encoding
  - Reversible transformation of data
- Hashing
  - One-way transformation of data with algo
- Encryption
  - Secure encoding of data e.g. with public-private key
- Common Cyber Attacks
  - Case Study

Self-Study Check-in

1) Which of the following is not an operating system launched by Windows?

A. Windows XP
B. Windows 98
C. Windows 8
D. Windows 9
E. Windows 10

2) Which operating system doesn't support networking between computers?

A. Windows 3.1

B. Windows 95

C. Windows 2000

D. Windows NT

3) Which of the following is the extension of Notepad?

A. .ins

B. .exe

C. .bpm

D. .png

A Summary of Windows

What is Windows?

Microsoft Windows, also called Windows and Windows OS, computer operating system (OS) developed by Microsoft Corporation to run personal computers (PCs).

Featuring the **first graphical user interface (GUI)** for IBM-compatible PCs, the Windows OS soon dominated the PC market.

Approximately **90% of PCs run some version of Windows**.

What is Windows?

The first version of Windows, released in **1985**, was simply a GUI offered as an extension of Microsoft's existing disk operating system, or **MS-DOS**.

Based in part on licensed concepts that Apple Inc. had used for its Macintosh System Software, Windows for the first time allowed DOS users to visually navigate a virtual desktop, opening graphical "windows" displaying the contents of electronic folders and files with the click of a mouse button, rather than typing commands and directory paths at a text prompt.

Windows 11

Windows 11 is Microsoft's **newest major release** of its operating system and the successor to Windows 10.

The OS features an all-new simplified, yet modernized, interface and was designed to inspire productivity and creativity.

Windows 11 For Developers

PWA - Progressive Web Apps

Windows 11 features the new PWABuilder3, so developers can build a PWA from their web app in minutes.

WebView2 runtime is included with Windows 11, which makes it easier to take advantage of its web platform as a secure way to build hybrid web apps.

Offerings like Windows Terminal and the new Microsoft Edge DevTools can still be used, as they are now included in Windows 11.

Windows 11 For Developers

Windows App SDK

The Windows App SDK (previously known as Project Reunion) will make it easier to integrate Windows 11 features into apps, but it still allows developers to reach more than a billion users on Windows 10.

The Windows App SDK 1.0 is set to be released soon.

Windows History

MS-DOS

Windows 1.0 required a minimum of 256 kilobytes (KB), two double-sided floppy disk drives, and a graphics adapter card.

A hard disk and 512 KB memory was recommended for running multiple programs or when using DOS 3.0 or higher.

It was originally developed by **Microsoft for IBM-compatible personal computers**. Although the first version of OS from Microsoft, MS-DOS was a little-used or preferred alternative to Apple's Macintosh. Despite witnessing little success, Microsoft continued to offer support for MS-DOS till the development of Windows XP.

What is MS-DOS?

Microsoft Disk Operating System

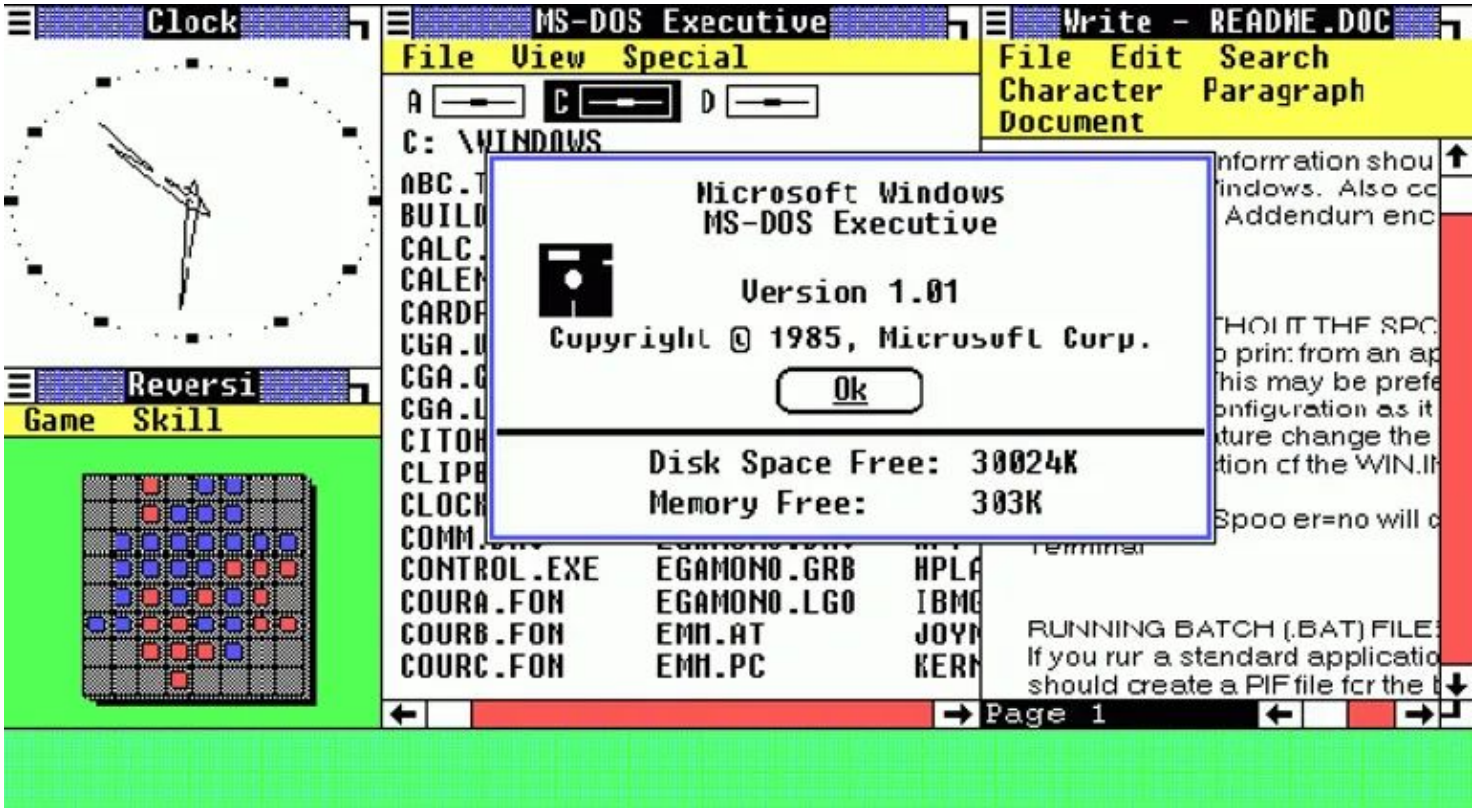
Windows 1.0 – 2.0

Date: 1985-1992

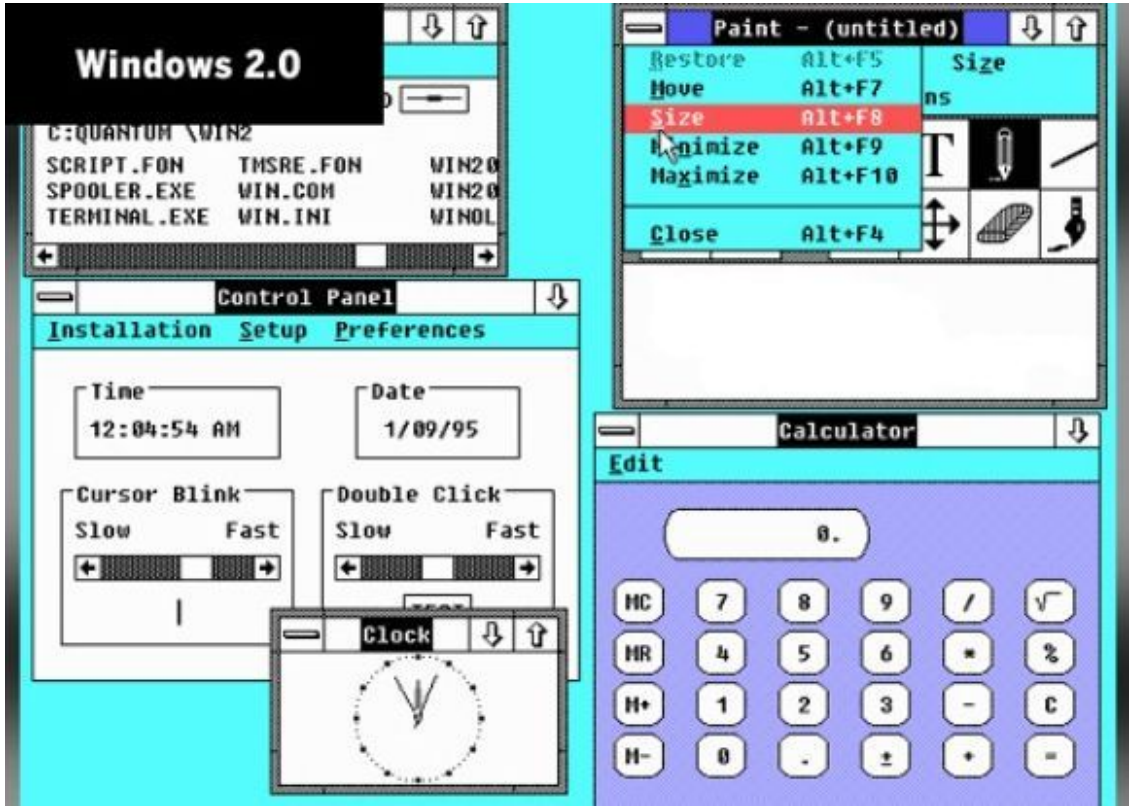
Instead of typing MS-DOS commands, Windows 1.0 allowed **users to point and click to access the windows**.

In 1987 Microsoft released Windows 2.0, which was designed for the Intel 286 processor. This version added **desktop icons, keyboard shortcuts, and improved graphics support**.

Windows 1.0 – 2.0



Windows 1.0 – 2.0



Windows 3.0 - 3.1

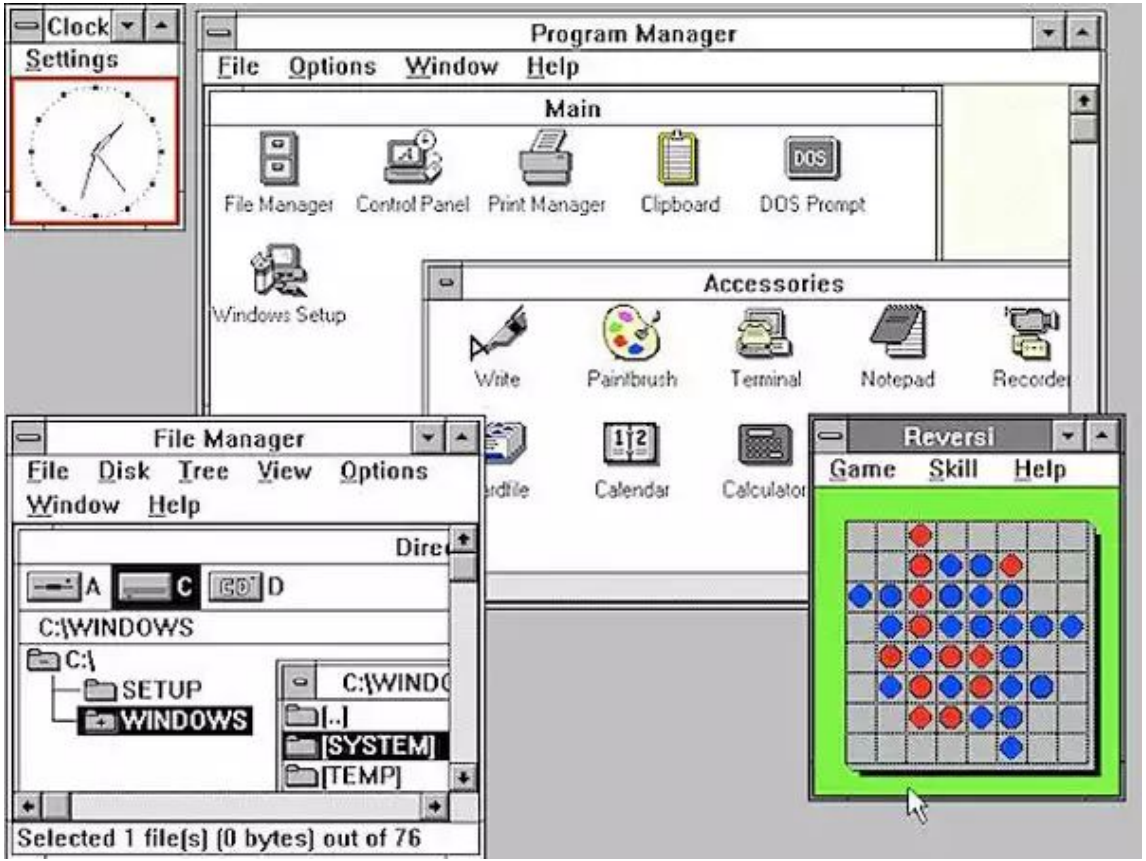
Date: 1990–1994

Microsoft released Windows 3.0 in May 1990 offering **better icons, performance and advanced graphics with 16 colors** designed for Intel 386 processors.

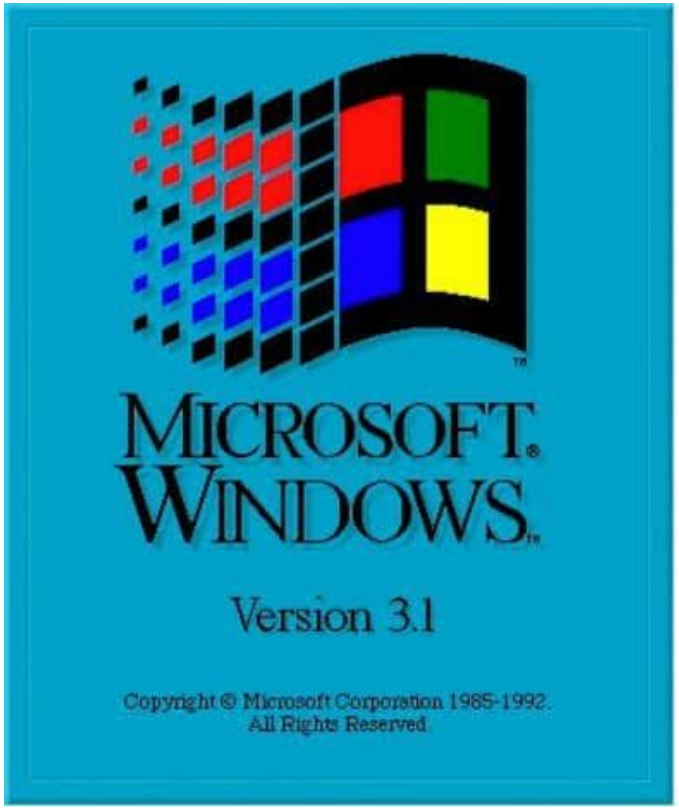
Its popularity grew by manifolds following the release of SDK that helped software developers focus more on writing and less on writing device drivers. With Windows 3.0 Microsoft completely rewrote the application development environment.

The OS included **Program Manager, File Manager, Print Manager and games**, remember Solitare, a complete time-waster??

Windows 3.0 - 3.1



Windows 3.0 - 3.1



Windows 95

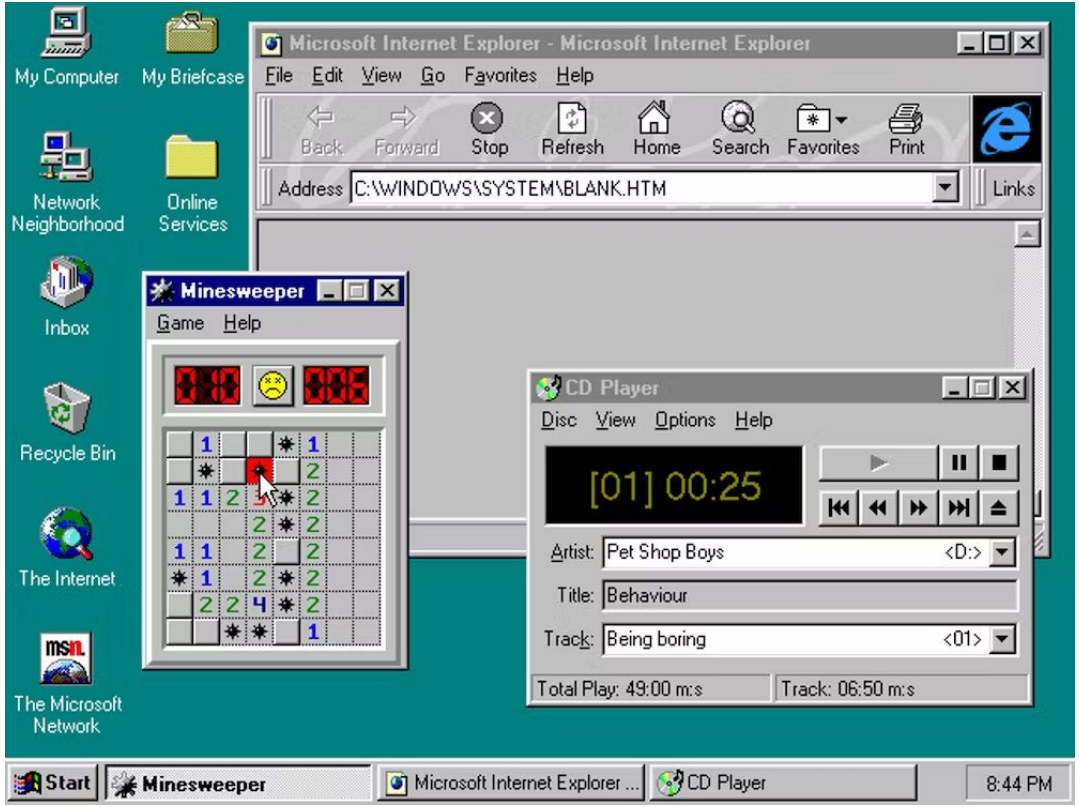
Date: August 1995

A major release of the Microsoft Windows operating system that caused Apple's Market share to decline or shrink was Windows 95.

Windows 95 as the name suggests was released in 1995 represented a significant advance over its precursor, Windows 3.1.

By the way, this was also the time when the first version of Microsoft's proprietary browser – **Internet Explorer 1 was rolled out** in August 1995 to catch up the Internet wave.

Windows 95


My Computer
My Briefcase
Network Neighborhood
Online Services
Inbox
Recycle Bin
The Internet
The Microsoft Network
Microsoft Internet Explorer - Microsoft Internet Explorer
File Edit View Go Favorites Help
Back Forward Stop Refresh Home Search Favorites Print
Address C:\WINDOWS\SYSTEM\BLANK.HTM
Links
Minesweeper
Game Help
CD Player
Disc View Options Help
[01] 00:25
Artist: Pet Shop Boys
Title: Behaviour
Track: Being boring
Total Play: 49:00 m:s
Track: 06:50 m:s
Start
Minesweeper
Microsoft Internet Explorer ...
CD Player
8:44 PM

Windows 95

Windows 98

Release Date: June 1998

Described as an operating system that “**Works Better & Plays Better**, ‘Windows 98’ offered support for a number of new technologies, including FAT32, AGP, MMX, USB, DVD, and ACPI.

Also, it was the first OS to include a tool called Windows Update. The tool alerted the customers when **software updates became available** for their computers.

Windows 98


My Computer
Internet Explorer
My Documents
Welcome to Windows 98
Microsoft Windows98
CONTENTS
Register Now
Connect to the Internet
Discover Windows 98
Maintain Your Computer
Welcome
Welcome to the exciting new world of Windows 98, where your computer desktop meets the Internet!
Sit back and relax as you take a brief tour of the options available on this screen.
If you want to explore an option, just click it.
Show this screen each time Windows 98 starts.
Continue
Windows Update
Programs
Favorites
Documents
Settings
Find
Help
Run...
Log Off Tyomitch...
Shut Down...
Windows98
channel guide
news & technology
sports
business
entertainment
lifestyle & travel
The Microsoft Network
News
PointCast
AOL
Start
Welcome to Windows 98
12:31 AM

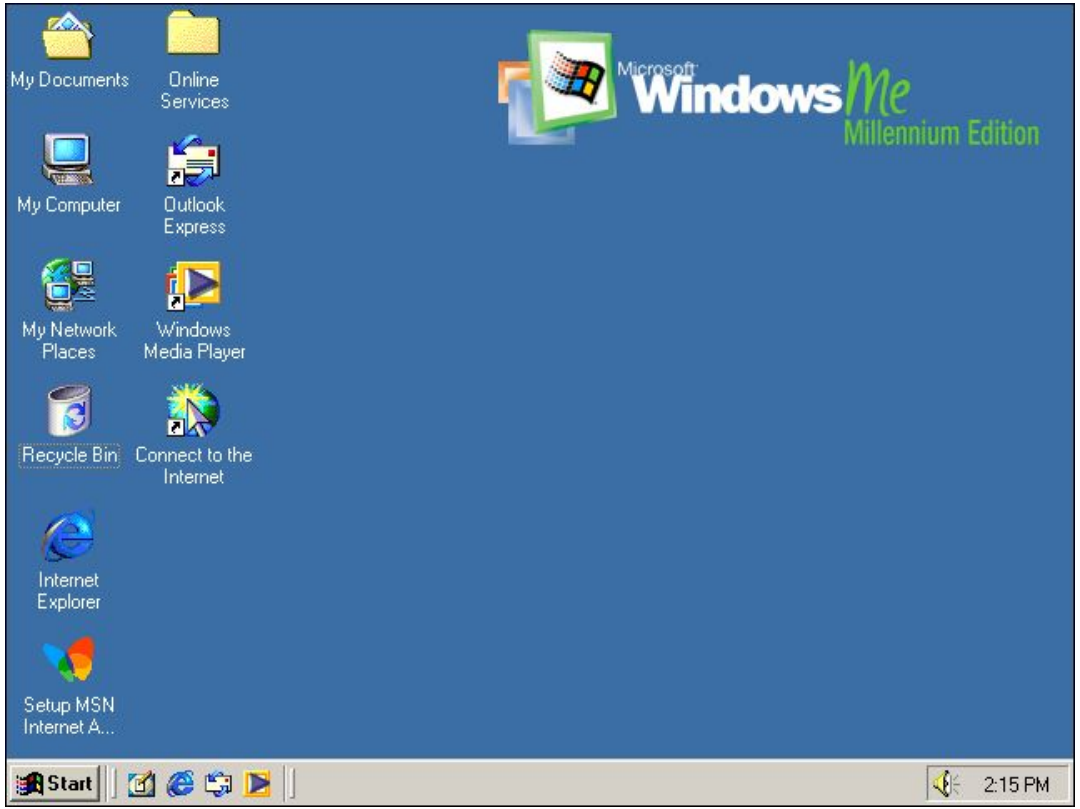
Windows ME

Release Date: 2000

The Windows Millennium Edition, referred as “Windows Me” was an update to the Windows 98 core that included some features of the Windows 2000 operating system.

The version had the “boot in DOS” option removed but included other enhancements like **Windows Media player and Movie Maker** for basic video editing.

Windows ME


My Documents
Online Services
My Computer
Outlook Express
My Network Places
Windows Media Player
Recycle Bin
Connect to the Internet
Internet Explorer
Setup MSN Internet A...
Microsoft Windows Me Millennium Edition
Start
2:15 PM

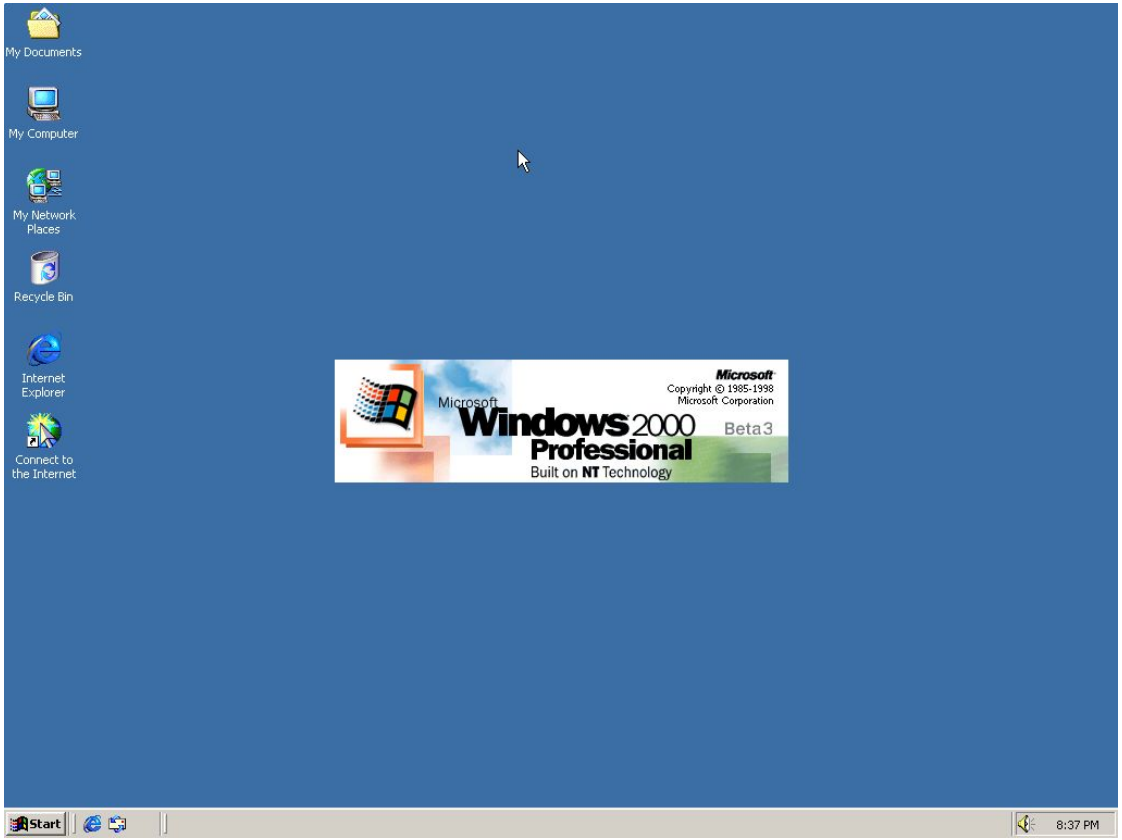
Windows 2000

Release date: February 2000

W2K (abbreviated form) was an operating system for business desktop and laptop systems to run **software applications, connect to Internet and intranet sites**, and **access files, printers, and network resources**. Windows 2000 4 versions released by Microsoft

Professional (for business desktop and laptop systems) Server (both a Web server and an office server) Advanced Server (for line-of-business applications) Datacenter Server (for high-traffic computer networks)

Windows 2000



Windows XP

Release date: October 25, 2001

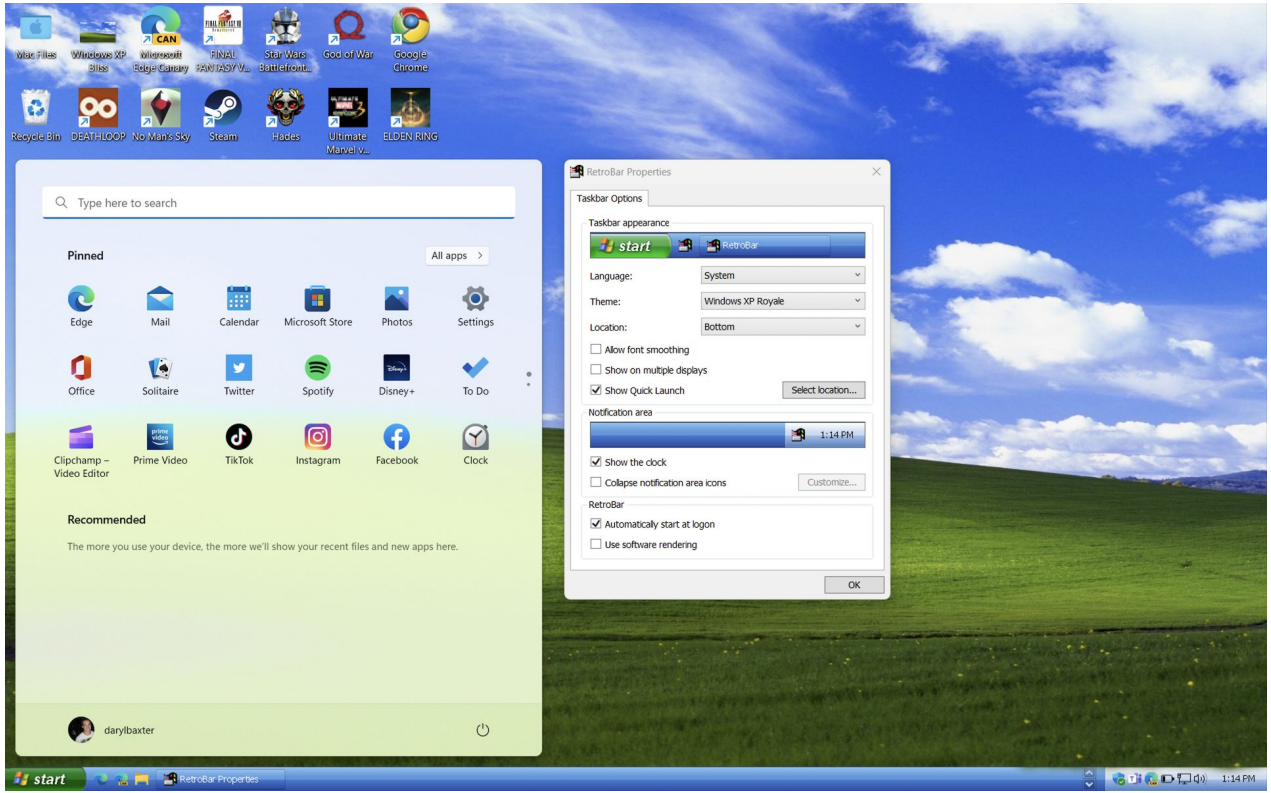
This version of the OS was built on Windows 2000 Kernel and was introduced in 2001 along with a redesigned look and feel. It was made available to the public in 2 versions:

Windows XP Home

Windows XP Professional

Microsoft focused on mobility for both editions, including plug and play features for connecting to wireless networks was introduced in this version of Windows, and it proved to one of Microsoft's best-selling products. Its use started declining with more Windows 7 deployments.

Windows XP


Mac Files
Windows XP Bliss
Microsoft Edge Canary
FINAL FANTASY V...
Star Wars Battlefront...
God of War
Google Chrome
Recycle Bin
DEATHLOOP
No Man's Sky
Steam
Hades
Ultimate Marvel v...
ELDEN RING
Type here to search
Pinned
All apps
Edge
Mail
Calendar
Microsoft Store
Photos
Settings
Office
Solitaire
Twitter
Spotify
Disney+
To Do
Clipchamp – Video Editor
Prime Video
TikTok
Instagram
Facebook
Clock
Recommended
The more you use your device, the more we'll show your recent files and new apps here.
darylbaxter
RetroBar Properties
Taskbar Options
Taskbar appearance
start
RetroBar
Language:
System
Theme:
Windows XP Royale
Location:
Bottom
Allow font smoothing
Show on multiple displays
Show Quick Launch
Select location...
Notification area
1:14 PM
Show the clock
Collapse notification area icons
Customize...
RetroBar
Automatically start at logon
Use software rendering
OK
start
RetroBar Properties
1:14 PM

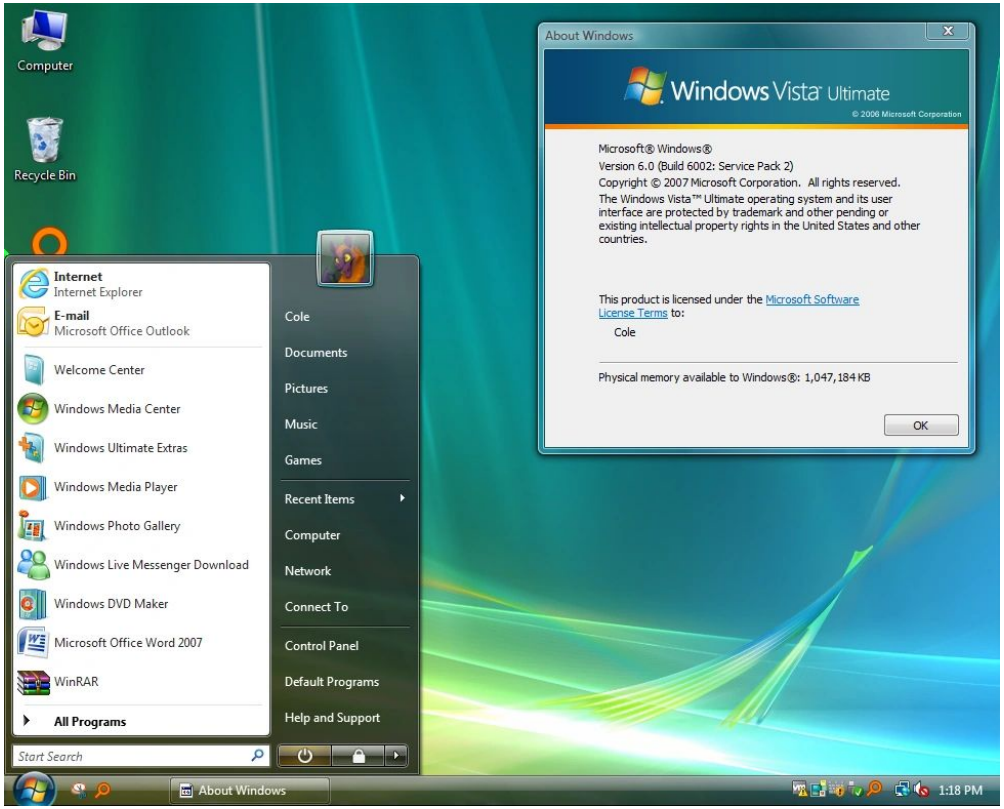
Windows Vista

Windows Vista (2006) is widely acknowledged to have had a mixed reception (to put it somewhat mildly) but there were elements of Vista which were held in high regard by reviewers;

Vista was defined as having been designed for more **powerful computers** and users which resulted in many individuals feeling they did not get full use out of the system.

Some individuals praise Vista highly, whilst others note that for the everyday users, **Vista may not be an essential upgrade**. Microsoft cited Vista as having the **strongest security system to date**, with enhancements to Windows Media Player and a rebranded look to search and the Windows start button.

Windows Vista



Windows 7

Release date: July 22, 2009

2009 saw the introduction of Windows 7 and Windows Touch;

New features such as **snap, peek and shake** improve Windows functionality and inspire a fun use of the interface. Windows Touch allow users with touchscreen devices to use the functionality for web browsing, picture viewing, file navigation etc.

Windows 7


Recycle Bin
My Pictures
Documents library
Package Price List
photo price list
2 items
14 items
Autumn Leaves
Autumn Trail
Chrysanthemum
Fountain
Small Waterfall
Spring Bridge
Spring Tree
Summer Beach
Sunflowers
Tulips
Waterfall
Winter Landscape
Winter Snow
Yellow Flowers

Windows 8

Release date: October 26, 2012

Windows 8 was released in 2012 and included the **biggest change to the Windows interface to date**, which many argued was best suited to touchscreen users. A particularly appreciated version of Windows 8 was its lock screen.

Bill Gates' vision of future computing was **Touch and voice replacing mouse and keyboard**. We already have the touch with Windows 8, a completely redesigned OS built from the ground up.

The OS replaces the more traditional Microsoft Windows OS look and feels with a new "Modern Interface" consisting of flat tiles that first debuted in the Windows Phone 7 mobile operating system.

Windows 8


Start
User
Mail
Calendar
Internet Explorer
Sports
Money
Help+Tips
OneDrive
Store
People
Skype
Photos
OneNote
Health & Fitness
Food & Drink
Desktop
Weather
News
Maps
Reading List

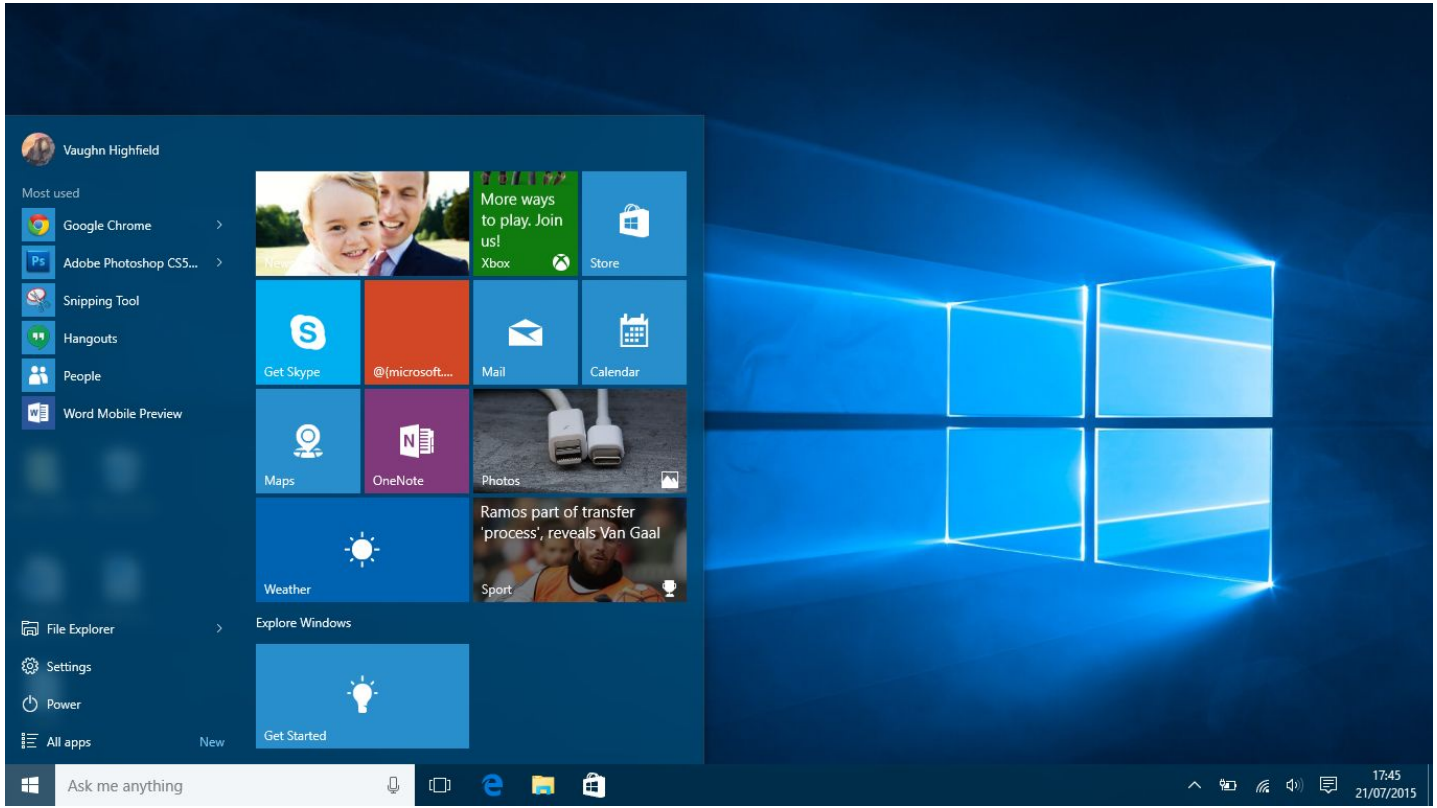
Windows 8.1

Release date: October 17, 2013

Windows 8.1 changed a few things for the better which were found wanting in Windows 8.

Notable changes included a **visible Start button**, improved Start screen, Internet Explorer 11, tighter OneDrive integration, Bing-powered unified search box, the ability to land on the desktop on login instead of the Start screen.

Windows 8.1


Vaughn Highfield
Most used
Google Chrome
Adobe Photoshop CS5...
Snipping Tool
Hangouts
People
Word Mobile Preview
File Explorer
Settings
Power
All apps
New
More ways to play. Join us!
Xbox
Store
Get Skype
@(microsoft....
Mail
Calendar
Maps
OneNote
Photos
Weather
Ramos part of transfer 'process', reveals Van Gaal
Sport
Explore Windows
Get Started
Ask me anything
17:45
21/07/2015

Windows 10

Release date: 28 July, 2015

Windows 10 has been described as the '**last operating system**' from Microsoft. It is now a series of releases that receives half-yearly feature updates. They are referred to as Windows 10 v1501, Windows 10 1803 and so on..

The OS introduced **Edge** a new browser meant to **replace Internet Explorer**. It supports Universal Apps which Universal apps can be **designed to run across multiple Microsoft product families** like PCs, tablets, smartphones, embedded systems, Xbox One, Surface Hub and Mixed Reality. It has been well received – but its Automatic Windows Update system is one area that is disliked by some.

Windows 10


Suggested
Microsoft Mahjong
Free
A
Afterlight
Allrecipes
C
Calculator
Calendar
Camera
D
Dragon Mania Legends
Dropbox
E
Edmodo
Excel 2016
G
Welcome Daniela!
How can I help you today?
Cortana
Mike Kong
School Project
Notes
Mail
20
Photos
Sunny
68°F
88°
67°
Los Angeles
Store
Maps
Xbox
MINECRAFT
NETFLIX
Ask me anything
11:20 AM
8/18/2017

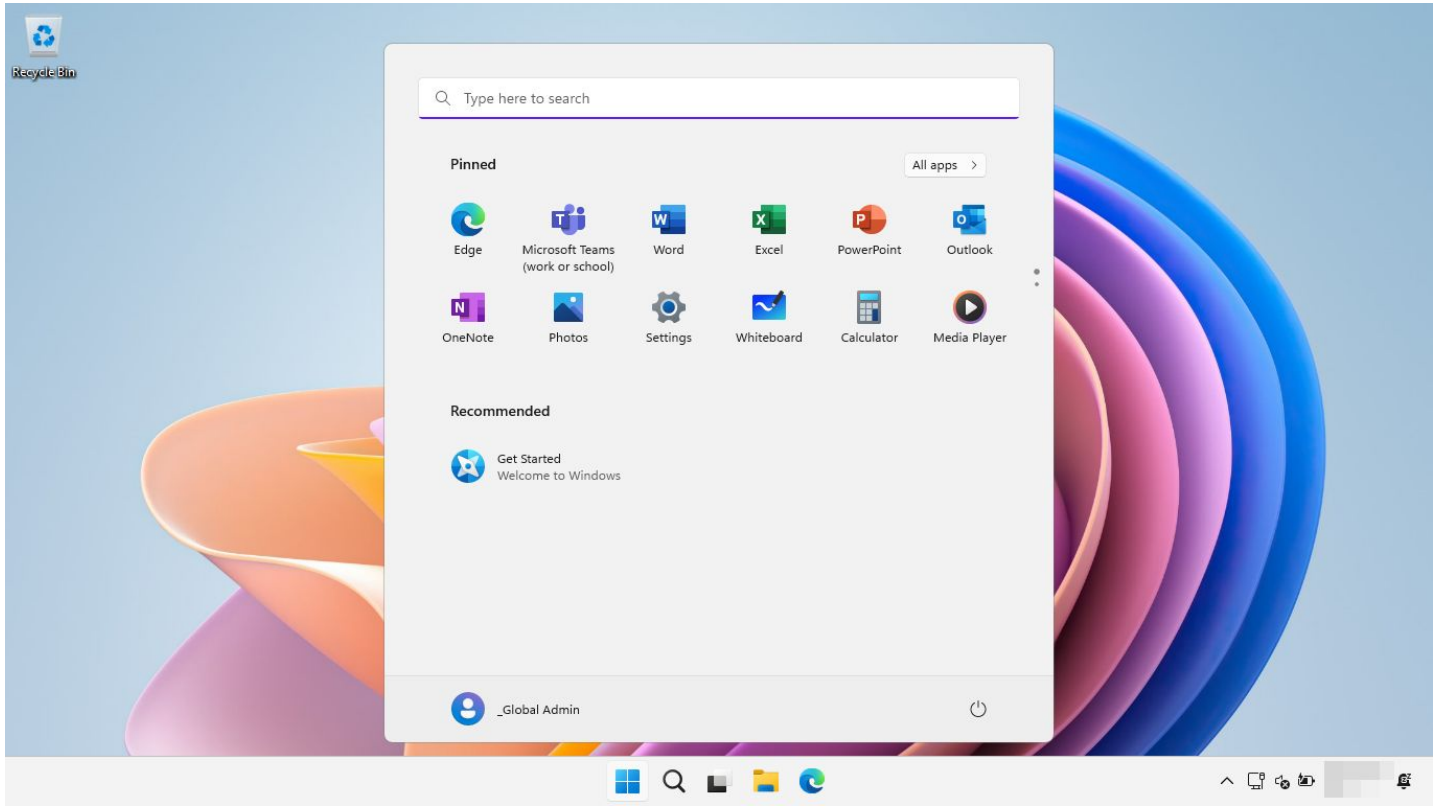
Windows 11

Release date: 2021

Windows 11, released in 2021, has all the features, power, and security of Windows 10.

The primary difference appears to be a redesigned desktop and the Settings menu. But apart from this, there are several other new features under the hood.

Windows 11


Recycle Bin
Type here to search
Pinned
All apps
Edge
Microsoft Teams (work or school)
Word
Excel
PowerPoint
Outlook
OneNote
Photos
Settings
Whiteboard
Calculator
Media Player
Recommended
Get Started
Welcome to Windows
_Global Admin

Break Time

Windows Server

What are Windows Servers?

Windows has made a line of operating systems specifically for use in servers.

Microsoft windows launched its first server in 2003, and up till now, lots of new versions have been launched.

The most recent one is windows server 2019.

Windows server is designed to be the s**tronger versions of their desktop operating systems**.

These servers have a firmer grip on networking, inter-organization messaging, hosting, and databases.

What are Windows Servers?

Complete Guide to Windows Server + Compare Differences

	What You Need to Know		
Windows NT Advanced Server 3.1 	First version of Windows Server	32-bit system	Supports newer server hardware
Windows NT Server 3.5 	Unix connectivity	Novell Netware connectivity	Ability to use with existing networks
Windows NT Server 3.51 	Stability improvements	Support for Windows 95	Remote software license management
Windows NT Server 4.0 	Microsoft Internet Information Server	Terminal Server Edition	Same look and feel as Windows 95
Windows Server 2000 	Support for Extensible Market Language	Active Server Pages	Integration with Active Directory for user authentication
Windows Server 2003 	Updated security features	Ability to define server roles	Inclusion of .NET environment

What are Windows Servers?

Windows Server 2003 R2		Active Directory Federation Services	Improved data compression	Security Configuration Wizard
Windows Server 2008		Hyper-Virtualization System	Event Viewer	Server Manager
Windows Server 2008 R2		64-bit environment	Improved group policy implementation	Remote Desktop Services
Windows Server 2012		Support for use in the Cloud	Improved Hyper-V functionality	Inclusion of Essentials edition
Windows Server 2012 R2		Updates to PowerShell	Enhanced functionality for storage	Ability to serve software to mobile devices
Windows Server 2016		Inclusion of Nano Server	Network Controller	Support for using containers
Windows Server 2019		Windows Admin Center	Hyper-converged infrastructure	Advanced Threat Protection

Windows Server VS Windows OS

Differences between OS and Server

1. Memory Support of Windows Server Is Higher Than Windows OS

Memory support is one of the key differences between the two. Windows server **supports more memory** than windows operating system. Different versions of the windows server have a distinct memory limit. You can find out the specification from the official site

Differences between OS and Server

2. Windows Server's Use of Hardware Is Very Effective

The end-user of windows servers are usually **large companies or enterprises** as compared to the Windows operating system whose end users are typically home-based desktops or small businesses.

That's why the windows server uses its hardware, especially its CPU, very effectively. If you use the Windows server, you are using your equipment at its full potential.

Differences between OS and Server

3. Windows Server Supports More Network Connections than Windows OS

Windows operating system can only handle up to 10 or 20 connections, but windows server has a much higher number in that regard.

Some servers can handle up to 65535 connections (MAX number of ports)

Differences between OS and Server

4. The Background and Foreground Task Priority

Windows servers are designed to prioritize tasks that are being performed in the background as compared to the functions that are being performed in the foreground.

In the Windows operating system by default, **foreground activities are given priority**. Although the priority can be changed according to your needs, still, the performance difference between the two is significant.

Differences between OS and Server

5. The Cost

The most obvious difference is the cost. Windows operating system is not as expensive as the Windows server.

Windows server’s license can cost from 500 to $6,200.

It is, in fact, designed for businesses and is priced accordingly.

Differences between OS and Server

6. No Extraneous Features in Windows Server

Windows server does not indulge in the features which compromise its energy. Obviously, it is designed for professional organizations.

For example, Microsoft Edge and Microsoft store can not be seen on the windows server.

When Will Windows Servers Be Used?

When Will We Use Windows Server?

1. Regulation Requirements
2. Specialized/ Specific Application Requirements
    a. Windows Server for hosting web pages, MS SQL for databases etc.
3. Company Preference

Windows For Programming

1. Structure of Drive for Installed apps and Program Files

The major difference between Program Files and Program Files (x86) is that the first one Program Files only contains 64-bit programs and applications, while the latter one Program Files (x86) only contains 32-bit programs and applications.

Windows **separates the 64-bit and 32-bit Programs** by using different program file folders, which is very convenient for users to distinguish them.

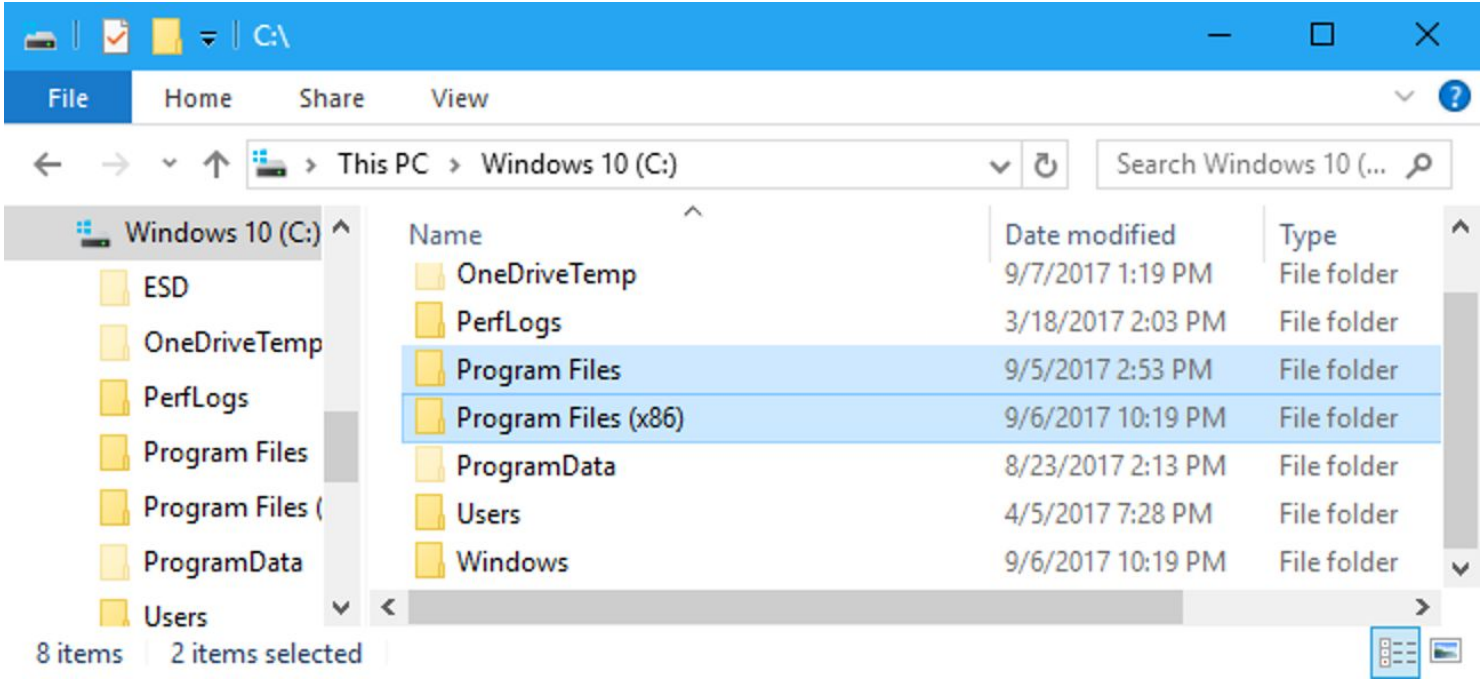
1. Structure of Drive for Installed apps and Program Files

Besides, it also considers the software conflicts issue. By installing them in different folders, the possibility of conflicts can be greatly reduced.

In addition, the file separation ensures that the old 32-bit programs can work properly and reduces the chance of them accidentally interacting with 64 bit software.

So you can find that there is no downsides to separate the 64-bit and 32-bit programs on your Windows OS.

1. Structure of Drive for Installed apps and Program Files



2. Environment Variable

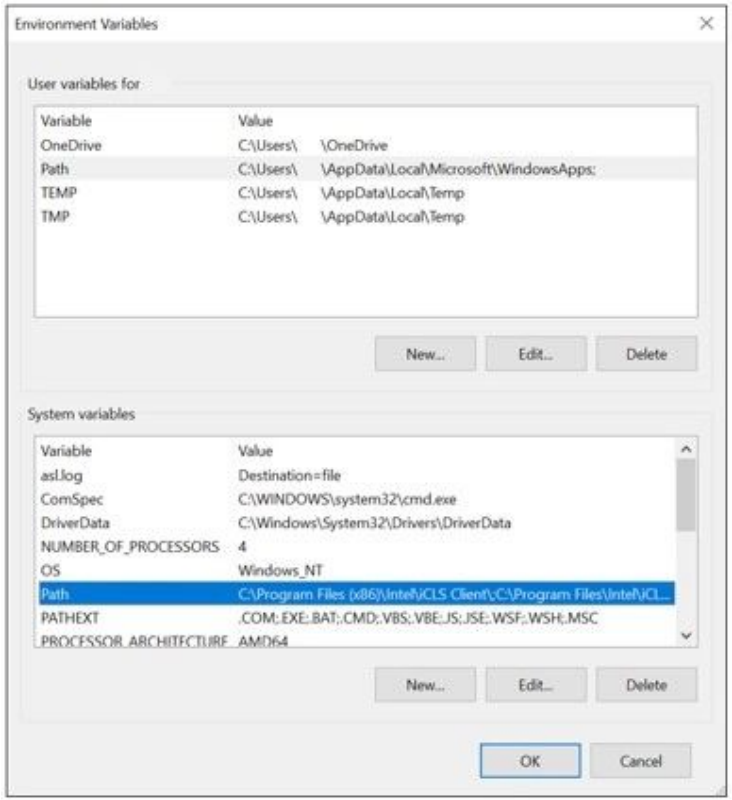
An environment variable is a dynamic "object" on a computer, containing an editable value, which may be used by one or more software programs in Windows.

Environment variables **help programs know and locate** what directory to install files in, where to store temporary files, and where to find user profile settings.

2. Environment Variable - Setting

1. Press the **Windows key+X** to access the Power User Task Menu.
2. In the Power User Task Menu, select the **System** option.
3. In the System window, scroll to the bottom and click the About option.
4. In the System > About window, click the Advanced system settings link at the bottom of the Device specifications section.
5. In the System Properties window, click the Advanced tab, then click the Environment Variables button near the bottom of that tab.
6. In the Environment Variables window (pictured below), highlight the Path variable in the System variables section and click the Edit button. Add or modify the path lines with the paths you want the computer to access. Each directory path is separated with a semicolon, as shown below.

2. Environment Variable - Setting

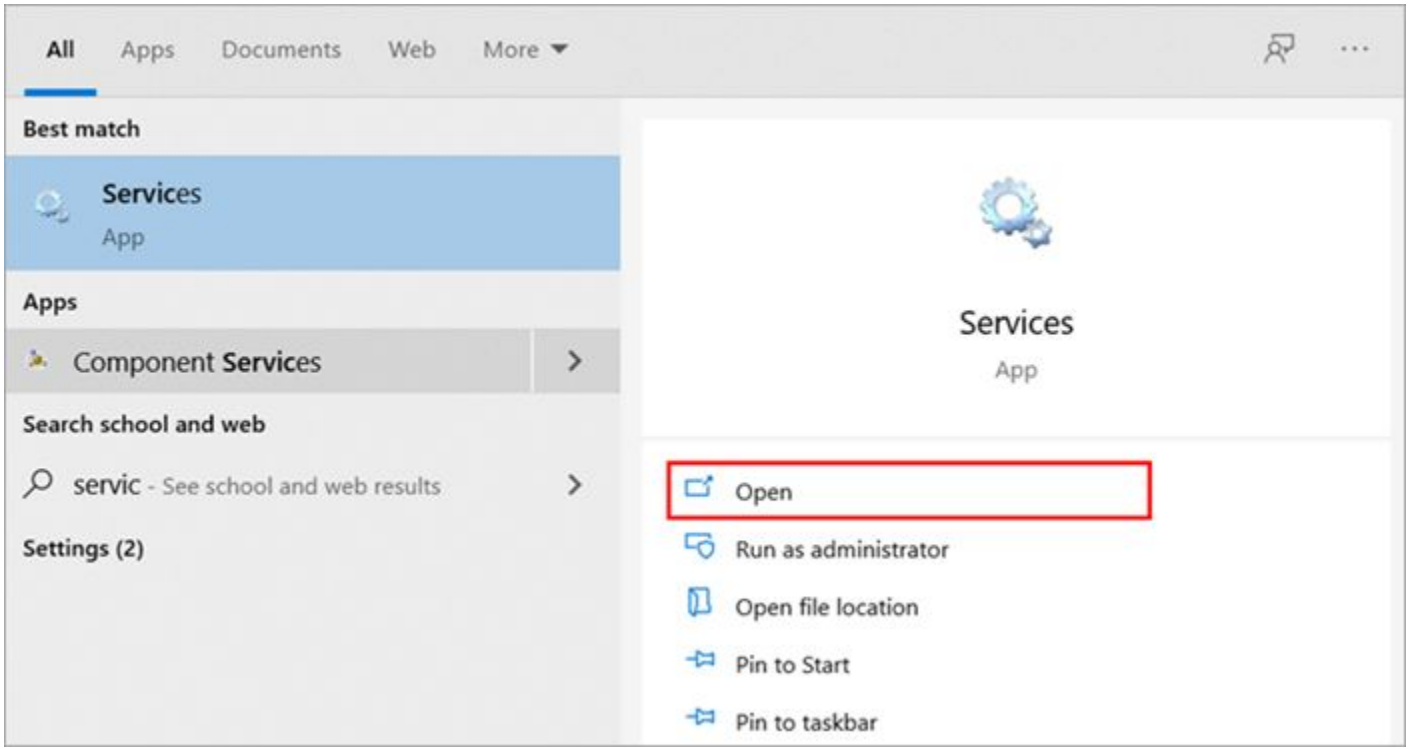


3. Windows Service Manager

Service Manager is a particular folder in Windows which allows users to access and change various essential services of the system.

It is Microsoft Management Console which enables users to **manage services in the system in GUI form**, and also it makes it easier for the users to Start/Stop or configure services settings.

3. Windows Service Manager



3. Windows Service Manager

Follow the steps listed below to access services now:

Type “Services” in the Windows start bar and press Enter. A few options will appear as displayed. Click on “Open“.

Command Line: Type Command Prompt in the Windows search bar and click on “Open”

4. Windows SDK/ App Dev Docs

Learn how to design, develop, and deploy apps and solutions for Windows PCs and other devices.

https://learn.microsoft.com/en-gb/windows/apps/

4. Windows SDK/ App Dev Docs

Some things you can do:

Dive into developing apps for Windows

Get started

Overview of app development options
Install tools for the Windows App SDK
Create your first WinUI 3 project
Sample apps for Windows

Design

Design and code your app UI
Design basics for Windows apps
Windows 11 design principles
Design toolkits

Develop

Windows development features
Windows App SDK features
Windows UI Library (WinUI)
Modernize your desktop apps

Deploy

Deployment architecture
Windows App SDK deployment guide
Package apps using MSIX
Manage your MSIX deployment

Develop for other Windows device platforms

Mixed Reality and HoloLens

Windows for IoT

Xbox One

What's next?

Group Assignment
https://github.com/su-ntu-ctp/6m-cloud-1.5-operating-systems-windows/blob/main/assignment.md