



Windows OS Concepts

DevOps Training

OPERATING SYSTEM FUNDAMENTALS

1. Components of an OS
2. Functions of an OS
3. Types of OS
4. Command-line tools

THE THREE ELEMENTS OF AN OS

- User Interface – The part of the OS that you interface with.
- Kernel – The core of the OS. Interacts with the BIOS (at one end), and the UI (at the other end).
- File Management System – Organizes and manages files.

OPERATING SYSTEM KEY FUNCTIONS

- File Management
- Application Management
- Built-in Utility Programs
- Control of Computer Hardware

OPERATING SYSTEM SUPPORTS

- Multiuser – Two or more users work with the computer at the same time
- Multitasking – Two or more processes running at the same time.
- Multithreading – Two or more parts of the same process running at the same time.

OPERATING SYSTEM TYPES EXAMPLES

- Microsoft Windows
- MacIntosh OS
- Linux

Journey of Windows OS

Home (Non-Professional) Versions & Professional (Business) Versions

Windows 95

Windows 98

Windows Me

Windows NT

Windows 2000

Windows XP (2001), Windows Vista, Windows 7, Windows 8, **Windows 10**

With **windows server 2019** as latest server version

DISK OPERATING SYSTEM (DOS)

- The first PC Operating System (1981)
- Not a Multitasking OS, only one program could run at a time
- A command-line interface, no GUI.
- Early versions of Windows sat on top of DOS and used it to communicate with the BIOS.
- Windows XP communicates directly with the BIOS, but allows commands to be entered via a command prompt.

WINDOWS REGISTERED FILE TYPES

- A particular file extension can be **registered** and **associated** with a particular program.

.docx files are associated with MS Word

.xlsx files are associated with MS Excel

.txt files are associated with Notepad

.html files are associated with IE

This is how Windows knows what to do when you double-click a file in My Computer.

DOS COMMANDS

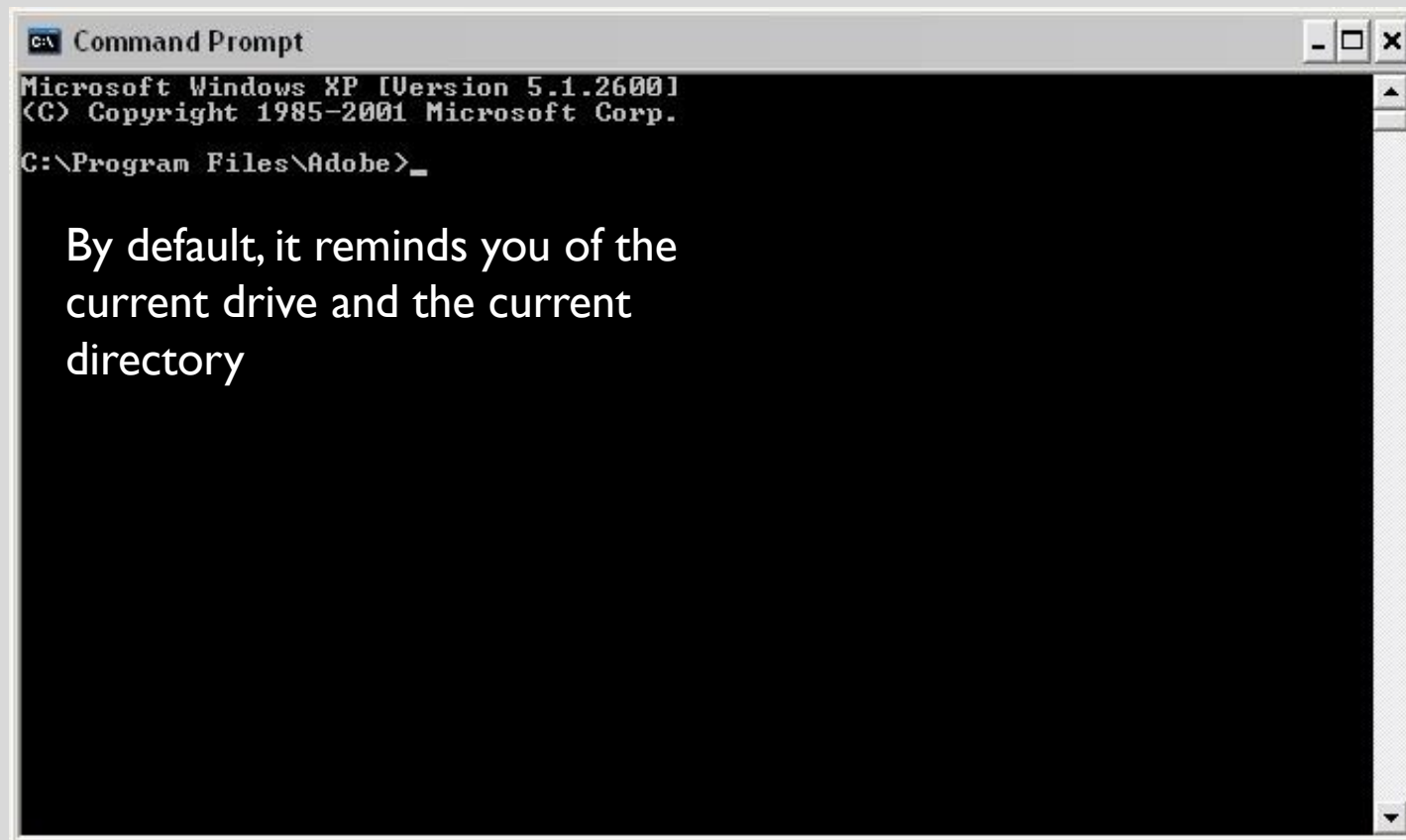
Two types – Internal and External

Internal commands are resident in the main kernel file: `command.com` (or **`cmd.exe`**)

External commands are separate little programs.

It's important to learn DOS commands because you can write scripts to execute a set of commands automatically.

DOS COMMANDS

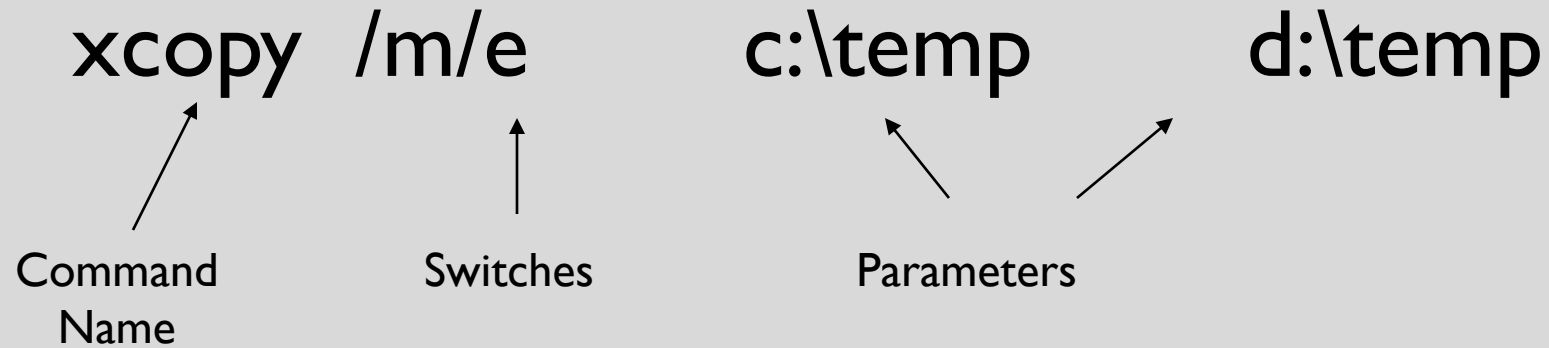


The image shows a screenshot of a Windows XP Command Prompt window. The title bar reads "C:\ Command Prompt". The window content displays the following text: "Microsoft Windows XP [Version 5.1.2600] Copyright 1985-2001 Microsoft Corp. C:\Program Files\Adobe>". A text overlay is present in the center of the window, stating: "By default, it reminds you of the current drive and the current directory".

```
C:\ Command Prompt
Microsoft Windows XP [Version 5.1.2600]
Copyright 1985-2001 Microsoft Corp.
C:\Program Files\Adobe>
```

By default, it reminds you of the
current drive and the current
directory

THREE PARTS OF A DOS COMMAND



DOS WILDCARD CHARACTERS

The "*" wildcard replaces any number of characters.

```
copy c:\temp\notes.* d:\temp
```

(copy all files with the name "notes" and any extension.)

```
copy *.doc c:\temp
```

(copy all files with a "doc" extension in the current directory.)

AT THE COMMAND PROMPT

A drive letter and a ":" (e.g. "f:") makes that your current drive.

CD (Change Directory)

cd (with no parameters) reminds you what the current directory is.

cd .. moves you to the parent of the current directory (up one level).

cd \ moves you to the root of the current drive.

cd <some directory> makes that your current directory.

DOS COMMANDS

- MD – Make directory.
- RD – Remove a directory or an entire directory tree.
- DIR – Display the contents of a directory.
- DEL (or ERASE) – Deletes one or more files.
- COPY – Places a copy of file(s) in a different folder.
- XCOPY – Flexible copy command used for copying large groups of files, commonly used for file backup.

DOS COMMANDS

- MOVE – Moves file(s) from one folder to another.
- REN(AME) – Renames file(s).
- ATTRIB – Displays or sets file attributes.
- FORMAT – Formats a disk.
- CHKDSK – Tests the file system on a disk, and reports status.
- DATE and TIME – Display & set the current date & time in the PC.
- TYPE – Displays the contents of a text file.

WINDOWS SERVICES

WHAT IS WINDOWS SERVICES?



Windows Services

- A.K.A NT Services
- long-running executable applications that run in their own Windows sessions
- Runs on background (no UI)
- Example services: DB Server, Anti-virus, SSH, HTTP, Printer Spooler, etc
- Configurable:
 - Runs on startup (computer boot)
 - Delay run
 - Manual / Auto run
 - Start with parameter
 - Starts for specific username
- An application can be programmable to run as a services via .NET (creating a Windows Service Application)

VIEW RUNNING SERVICES

1. Command Prompt
2. Task Manager
3. Services Manager
4. Computer Manager

C:\net start C:\net start | more

```
C:\Users\pvale>net start | more
These Windows services are started:

Adobe Acrobat Update Service
Application Information
AtherosSvc
AVCTP service
Background Intelligent Transfer Service
Background Tasks Infrastructure Service
Base Filtering Engine
Capability Access Manager Service
CNG Key Isolation
COM+ Event System
Connected Devices Platform Service
Connected Devices Platform User Service_4a1ab
Connected User Experiences and Telemetry
Contact Data_4a1ab
CoreMessaging
Credential Manager
Cryptographic Services
```

SERVICE RUNNING STATUS

Service Status

- Started
- Pause
- Pending
- Stop

Service Start Mode

- Automatic
- Manual
- Delay Start
- Disabled

Start As/By

- Local System
- Local Service
- Network Service

SERVICE RUNNING OPTIONS

Windows Firewall Properties (Local Computer)

General Log On Recovery Dependencies

Service name: MpsSvc

Display name: Windows Firewall

Description: Windows Firewall helps protect your computer by preventing unauthorized users from gaining access

Path to executable: C:\Windows\system32\svchost.exe -k LocalServiceNoNetwork

Startup type: Automatic

[Help me configure service startup options.](#)

Service status: Started

Start Stop Pause Resume

You can specify the start parameters that apply when you start the service from here.

Start parameters:

Windows Firewall Properties (Local Computer)

General Log On Recovery Dependencies

Log on as:

☐ Local System account

☐ Allow service to interact with desktop

☒ This account: Local Service Browse...

Password:

Confirm password:

[Help me configure user account log on options.](#)

You can enable or disable this service for the hardware profiles listed below:

| Hardware Profile | Service |
|------------------|---------|
| Undocked Profile | Enabled |

Windows Firewall Properties (Local Computer)

General Log On Recovery Dependencies

Select the computer's response if this service fails. [Help me set up recovery actions.](#)

First failure: Restart the Service

Second failure: Restart the Service

Subsequent failures: Take No Action

Reset fail count after: 1 days

Restart service after: 2 minutes

☐ Enable actions for stops with errors. Restart Computer Options...

Run program

TASK LIST & PID

```
c:\devops>tasklist
```

| Image Name | PID | Session Name | Session# | Mem Usage |
|---------------------|------|--------------|----------|-----------|
| System Idle Process | 0 | Services | 0 | 8 K |
| System | 4 | Services | 0 | 144 K |
| Registry | 96 | Services | 0 | 99,152 K |
| smss.exe | 412 | Services | 0 | 1,104 K |
| csrss.exe | 700 | Services | 0 | 5,060 K |
| csrss.exe | 792 | Console | 1 | 5,256 K |
| wininit.exe | 816 | Services | 0 | 6,196 K |
| winlogon.exe | 856 | Console | 1 | 12,992 K |
| services.exe | 936 | Services | 0 | 8,756 K |
| lsass.exe | 944 | Services | 0 | 21,592 K |
| svchost.exe | 544 | Services | 0 | 3,668 K |
| fontdrvhost.exe | 568 | Console | 1 | 6,256 K |
| fontdrvhost.exe | 596 | Services | 0 | 2,684 K |
| svchost.exe | 652 | Services | 0 | 31,152 K |
| svchost.exe | 572 | Services | 0 | 19,452 K |
| svchost.exe | 1060 | Services | 0 | 7,348 K |
| dwm.exe | 1128 | Console | 1 | 64,408 K |
| svchost.exe | 1172 | Services | 0 | 4,292 K |
| svchost.exe | 1252 | Services | 0 | 5,768 K |
| svchost.exe | 1332 | Services | 0 | 6,544 K |

POWER SHELL

- PowerShell is a task-based command-line shell and scripting language built on .NET.
- PowerShell helps system administrators and power-users rapidly automate tasks that manage operating systems (Linux, macOS, and Windows) and processes

POWER SHELL INVOKE

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\pvale> get-command *-service

CommandType      Name                                Version      Source
-----
Cmdlet            Get-Service                        3.1.0.0      Microsoft.PowerShell.Management
Cmdlet            New-Service                        3.1.0.0      Microsoft.PowerShell.Management
Cmdlet            Restart-Service                    3.1.0.0      Microsoft.PowerShell.Management
Cmdlet            Resume-Service                     3.1.0.0      Microsoft.PowerShell.Management
Cmdlet            Set-Service                        3.1.0.0      Microsoft.PowerShell.Management
Cmdlet            Start-Service                      3.1.0.0      Microsoft.PowerShell.Management
Cmdlet            Stop-Service                       3.1.0.0      Microsoft.PowerShell.Management
Cmdlet            Suspend-Service                    3.1.0.0      Microsoft.PowerShell.Management

PS C:\Users\pvale> get-help get-service

NAME
    Get-Service

SYNTAX
    Get-Service [[-Name] <string[]>] [-ComputerName <string[]>] [-DependentServices] [-RequiredServices] [-Include
    <string[]>] [-Exclude <string[]>] [<CommonParameters>]
```

it's
Q & A
TIME!



THANK YOU!

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