Name: Harshita Singh
Class: D10C
Roll : 66

EXPERIMENT 1

AIM: Create and run virtual machine on Hosted Hypervisor like virtual Box

Difference between Linux and Windows

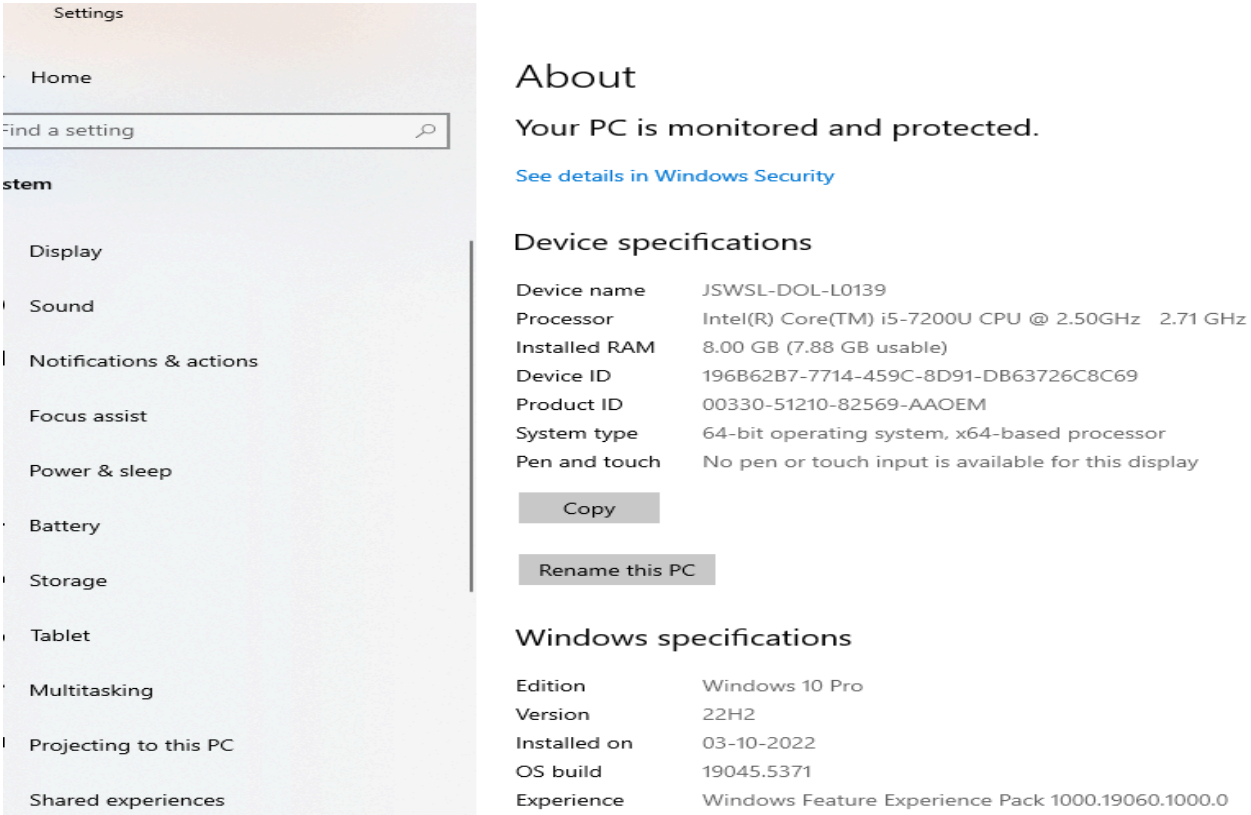
1. System Information

Windows:

Windows provides detailed system information, including device name, OS version, processor specs, and RAM (both total and usable). It also displays system type (e.g., 64-bit), product ID, and additional details like installation date and experience pack.

Ubuntu:

Ubuntu presents a minimalistic system information panel, showing OS version, processor, memory, and disk capacity. It lacks detailed identifiers like product ID but offers a "System Details" section for further exploration.



2. Display

Windows:

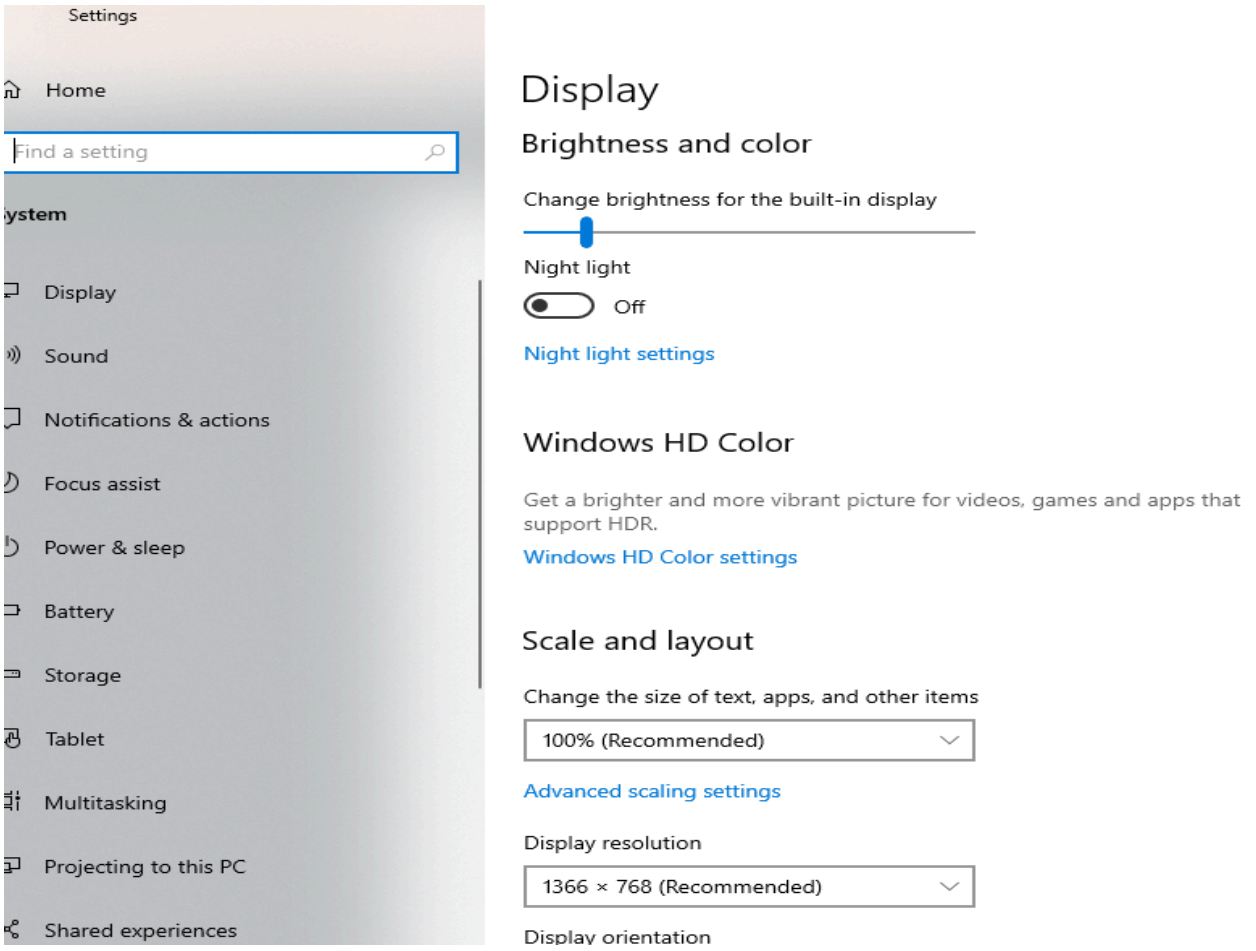
● Graphics Support: Windows supports a wide range of graphics cards (NVIDIA, AMD, Intel) and provides automatic driver installation. It offers built-in support for 2D and 3D graphics rendering.

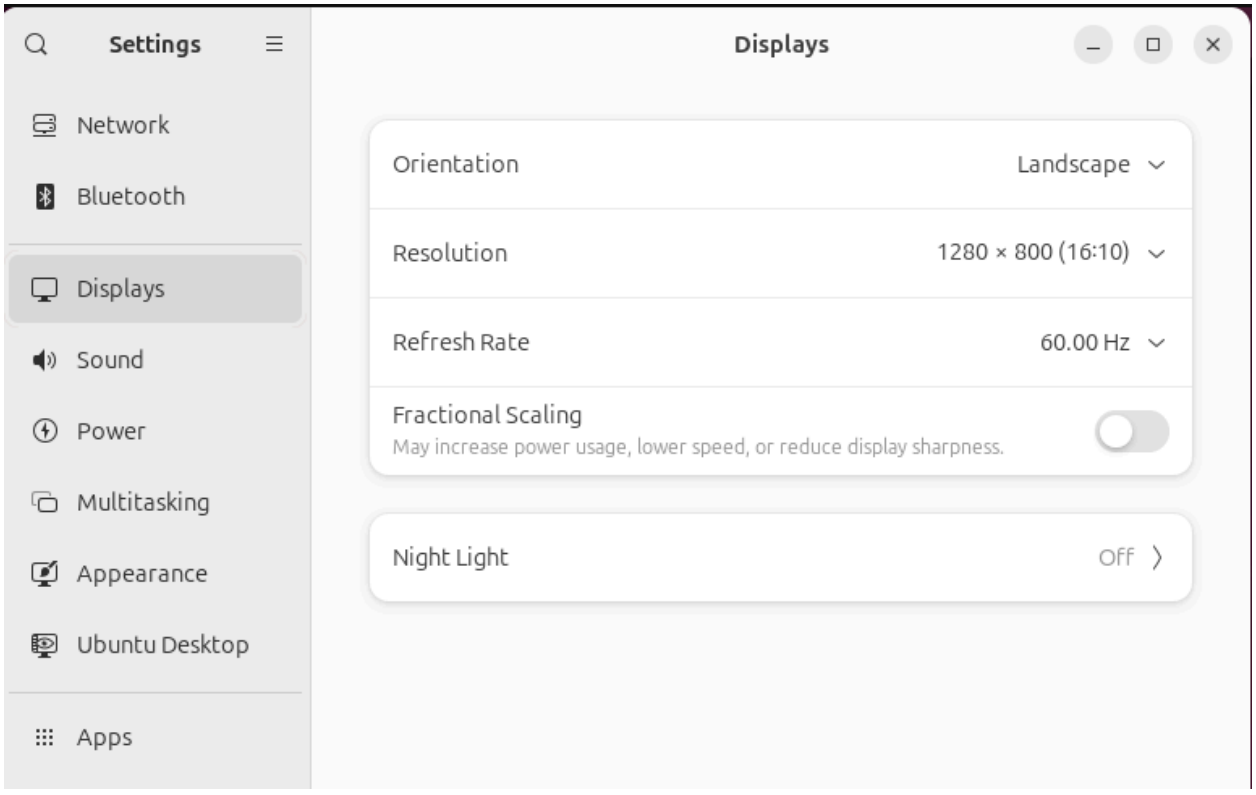
● Display Settings: Windows includes a graphical user interface to adjust display settings, resolution, multiple monitors, and color calibration through the Display Settings menu.

Ubuntu:

● Graphics Support: Ubuntu generally supports NVIDIA, AMD, and Intel graphics out of the box, but sometimes additional drivers need to be installed for optimal performance (especially proprietary drivers for NVIDIA graphics).

● Display Settings: You can configure displays through Settings > Displays. However, advanced display settings might require using terminal commands or installing proprietary drivers.


Settings
Home
Find a setting
ystem
Display
Sound
Notifications & actions
Focus assist
Power & sleep
Battery
Storage
Tablet
Multitasking
Projecting to this PC
Shared experiences
Display
Brightness and color
Change brightness for the built-in display
Night light
Off
Night light settings
Windows HD Color
Get a brighter and more vibrant picture for videos, games and apps that support HDR.
Windows HD Color settings
Scale and layout
Change the size of text, apps, and other items
100% (Recommended)
Advanced scaling settings
Display resolution
1366 × 768 (Recommended)
Display orientation

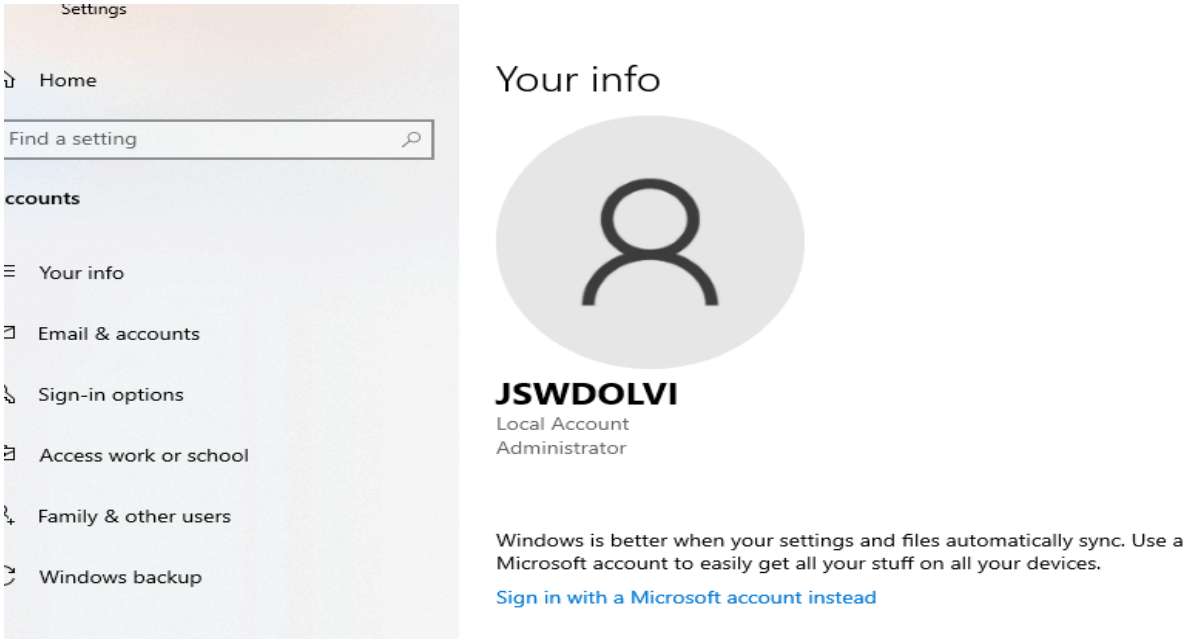

Settings
Network
Bluetooth
Displays
Sound
Power
Multitasking
Appearance
Ubuntu Desktop
Apps
Displays
Orientation
Landscape
Resolution
1280 × 800 (16:10)
Refresh Rate
60.00 Hz
Fractional Scaling
May increase power usage, lower speed, or reduce display sharpness.
Night Light
Off

3. User Management

Windows and Linux handle users and permissions differently.

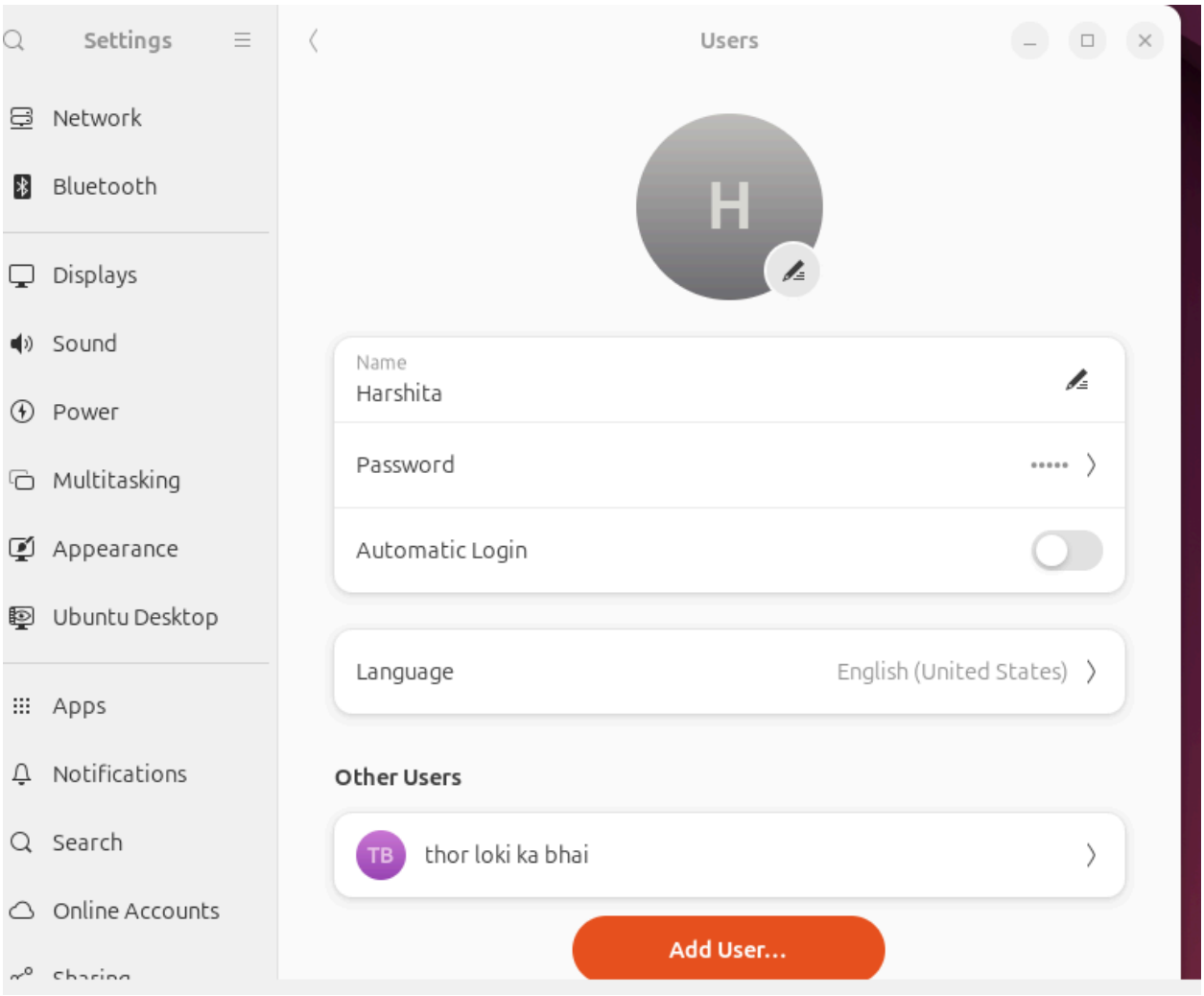
Windows:

- Uses a **hierarchical user system** with different permission levels:
    1. **Administrator**: Has full control over the system, can install software, modify system files, and manage user accounts.
    2. **Standard User**: Can run programs but cannot install or modify system settings.
    3. **Guest User**: Has very limited access.
- Uses **User Account Control (UAC)** to restrict unauthorized changes.
- Stores user data in `C:\Users\Username\`.



Linux:

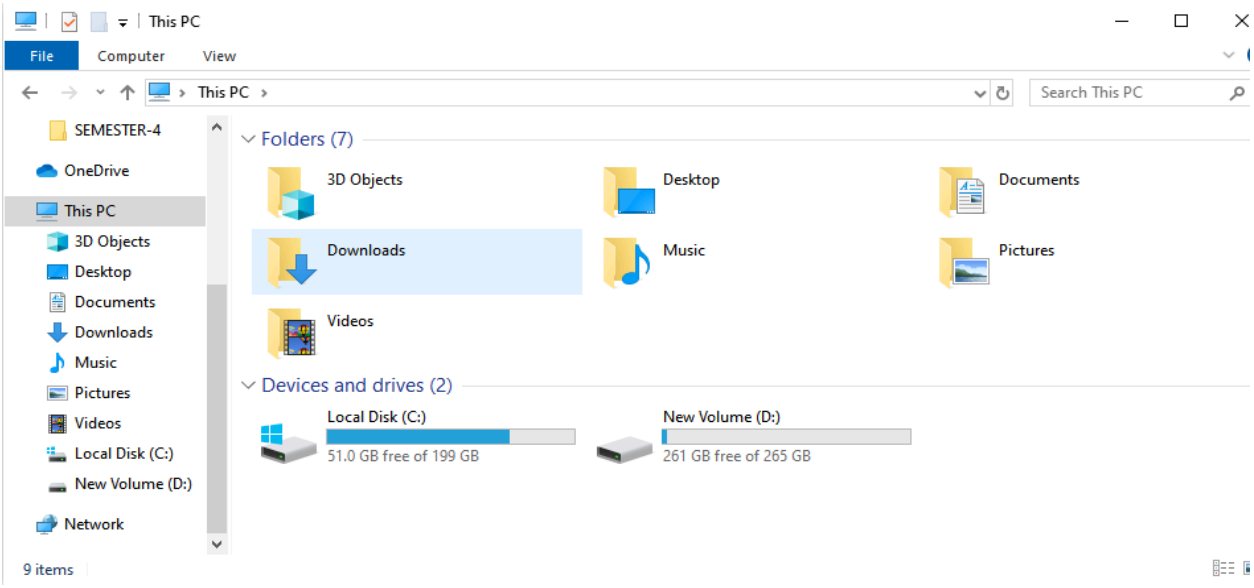
- Linux is a **multi-user** system by design, making it ideal for server environments.
- Users are classified as:
    1. **Root User (Superuser)**: Has full system access (`sudo` is used to execute commands as root).
    2. **Normal Users**: Limited access; they cannot modify system files.
    3. **Service Accounts**: Used by system processes (e.g., `www-data` for web servers).
- User permissions are managed using **Ownership and Group Permissions** (Read, Write, Execute).



4. File System

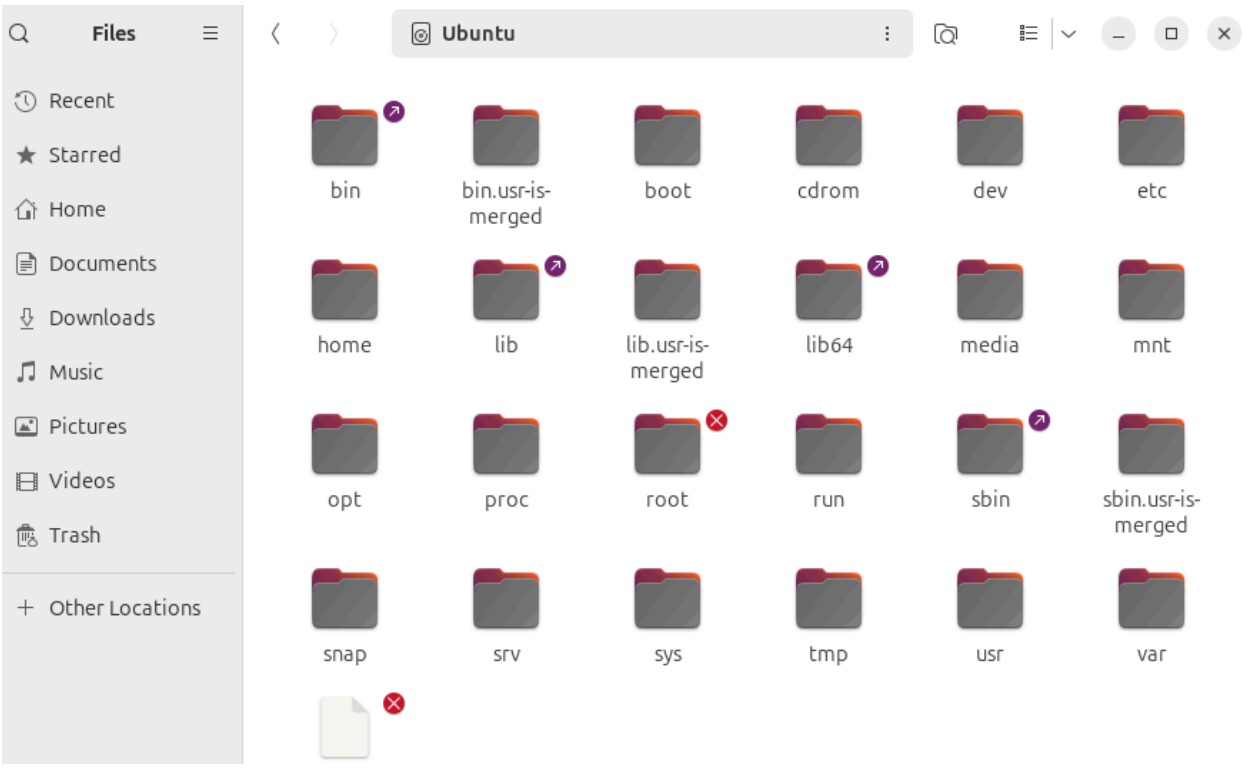
Windows:

- Uses **NTFS (New Technology File System)** by default, but also supports **FAT32 and exFAT**.
- Files and folders follow a **drive-based hierarchy**, meaning each storage device gets a drive letter (e.g., `C:\`, `D:\`).
- File paths use **backslashes** (`\`) (e.g., `C:\Users\Documents\file.txt`).
- Supports file attributes like **Read-only, Hidden, System**, but lacks advanced permission controls.



Linux:

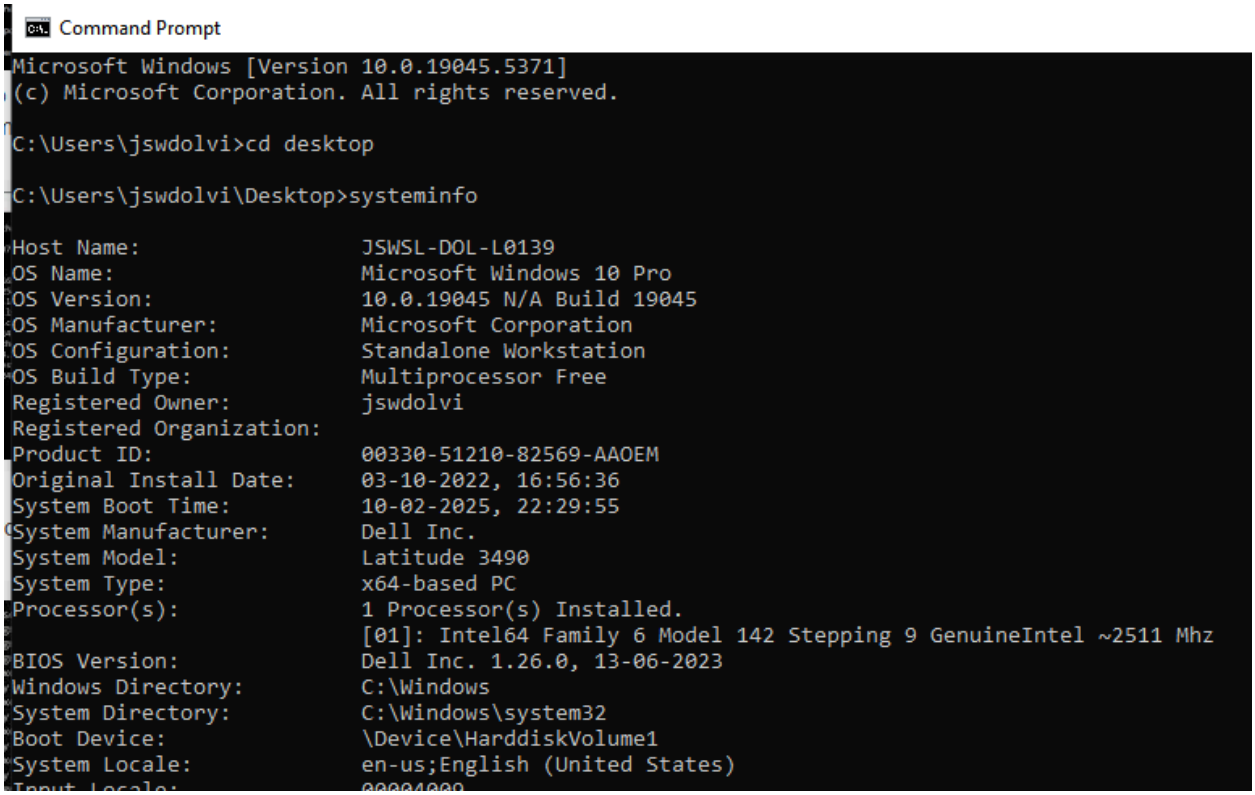
- Uses file systems like **EXT4 (most common), XFS, Btrfs, ZFS**.
- Follows a **single-root directory structure**, where everything starts from `/` (root directory).
- No drive letters; instead, storage devices are **mounted** as directories (`/mnt` or `/media`).
- File paths use **forward slashes** (`/`) (e.g., `/home/user/file.txt`).
- Uses an advanced **permission system** (`rwx` - Read, Write, Execute) and Access Control Lists (ACLs) for fine-grained control.



5. Command Line Interface (CLI)

Windows:

- Provides **Command Prompt (cmd.exe)** and **PowerShell**.
- Limited in functionality compared to Linux but improved with PowerShell (supports scripting and automation).
- CLI is not as commonly used for system administration.



Linux:

- CLI is a **core component** of Linux, often preferred over GUI.
- Popular shells include **Bash, Zsh, Fish**.
- Powerful tools like **grep, awk, sed, cron, systemctl** allow advanced scripting and automation.

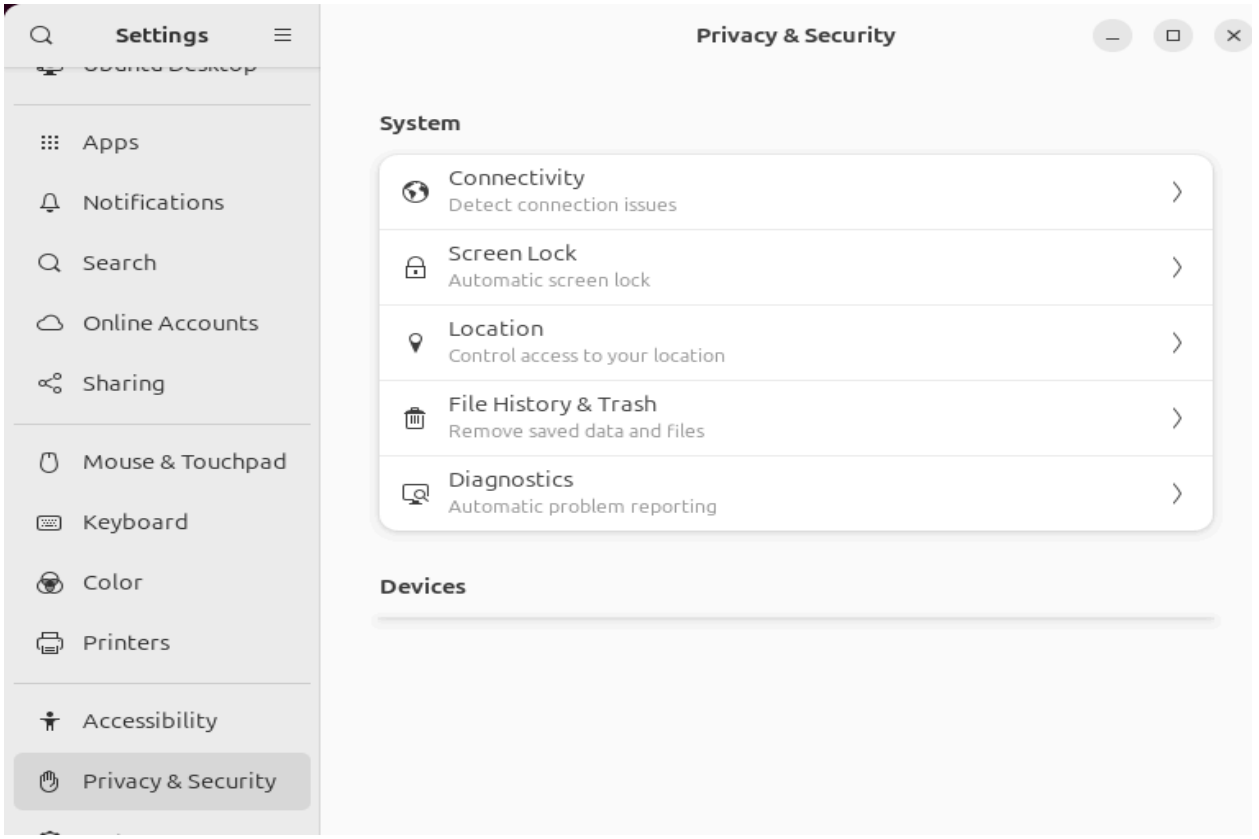
6. Security & Permissions

Windows:

- More **vulnerable to malware** due to its popularity.
- Uses **UAC (User Account Control)** to limit administrative actions.
- Has **Windows Defender** and third-party antivirus software for protection.

Linux:

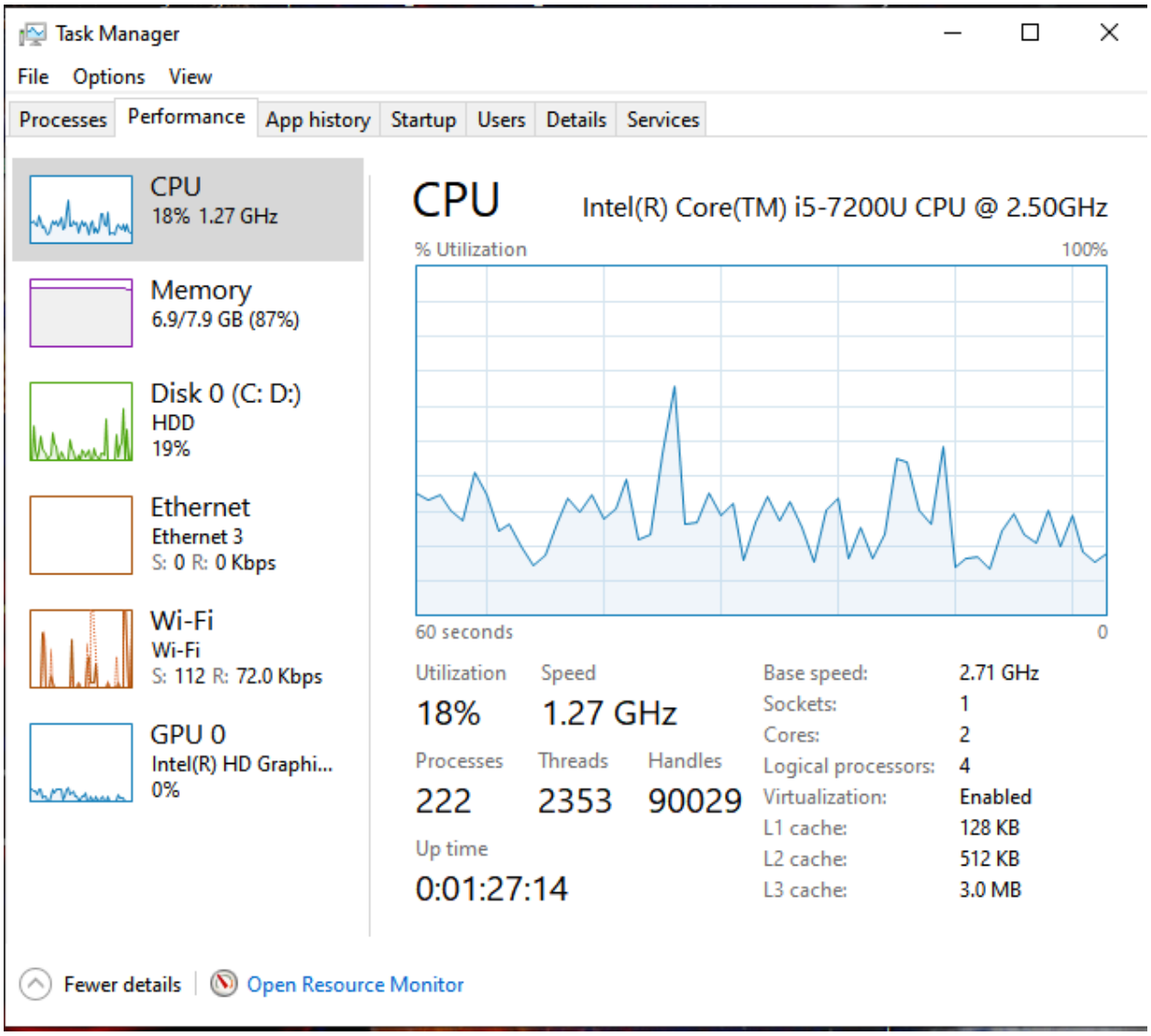
- More **secure by design** due to user permission models.
- Uses `sudo` to prevent unauthorized modifications.
- Less prone to viruses (malware needs **root privileges**, making it harder to execute).
- Open-source nature allows quick detection and fixing of vulnerabilities.



7. Performance & System Requirements

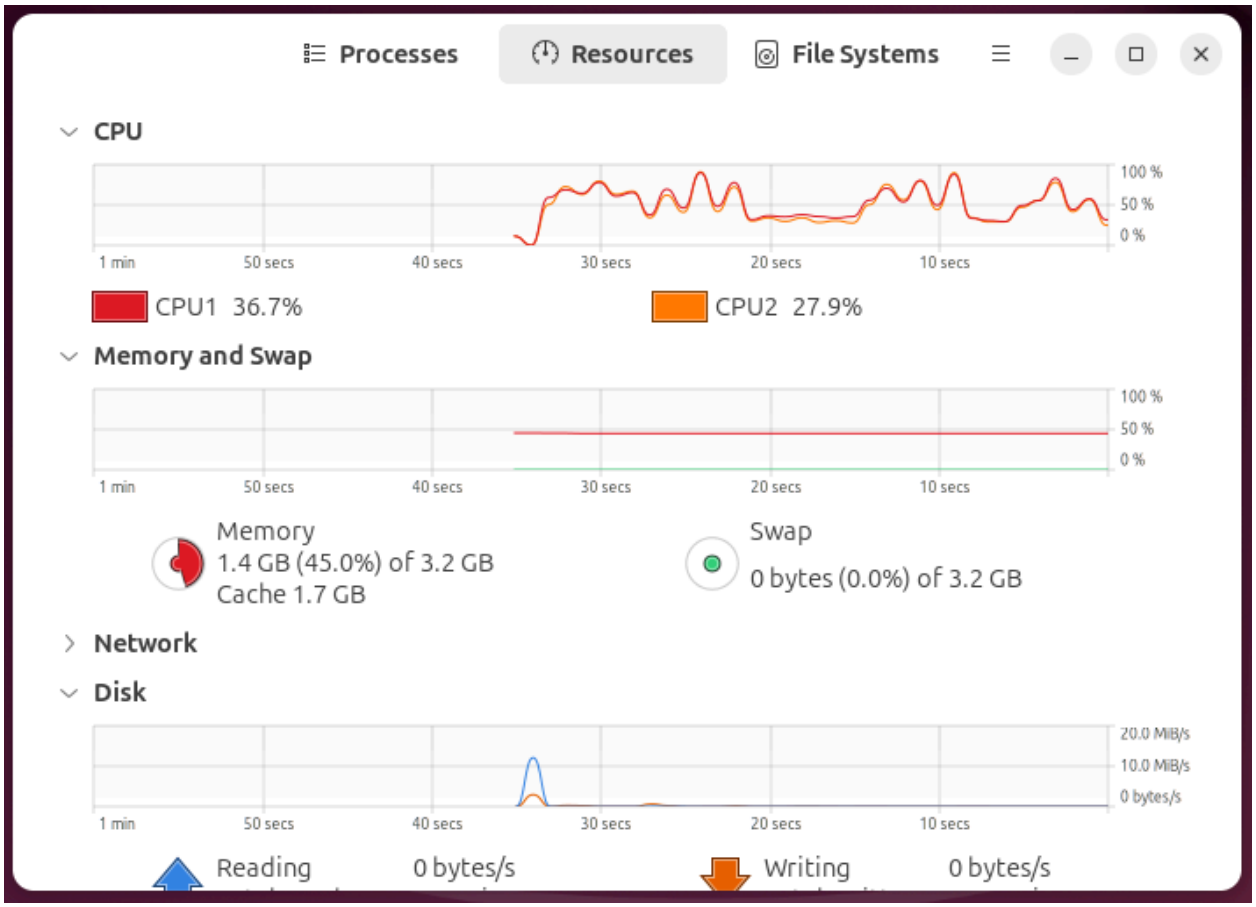
Windows:

- Consumes more **RAM and CPU** due to background processes and GUI-heavy design.
- Requires frequent reboots after updates.
- Slower on older hardware.



Linux:

- Can run on **low-end hardware** (lightweight distros like Lubuntu, Puppy Linux).
- More efficient memory and CPU usage.
- Does not require reboots for most updates.



8. System Updates

Windows:

- Windows updates are **automatic** and often **forced**.
- Updates are managed via **Windows Update**, which can cause performance issues.
- Often requires **system reboots** after updates.

Linux:

- Updates are **optional** and can be installed via **package managers** (`apt upgrade`).
- Most updates **do not** require a reboot (except for kernel updates).
- Security patches are delivered quickly due to community-driven development.

9. Customization & Flexibility

Windows:

- Limited customization (can change wallpapers, themes, but deeper UI changes are restricted).
- Uses the **same desktop environment** (Explorer.exe) with minor variations.

Linux:

- Highly customizable; users can choose from different **desktop environments** (GNOME, KDE, XFCE, Cinnamon, etc.).
- The look and feel of the system can be completely changed, even down to the **kernel level**.

10. Settings & Configuration

Windows:

- Uses a **GUI-based** approach for system settings.
- Configuration is stored in the **Windows Registry**, a centralized database for system settings.
- Has multiple configuration tools:
    - **Control Panel** (legacy settings).
    - **Settings App** (modernized interface).
    - **Group Policy Editor (gpedit.msc)** for advanced configurations.

Linux:

- Configuration is mostly **file-based** (stored in `/etc/`).
- Users can modify system settings using text-based configuration files (e.g., `/etc/fstab` for mounting, `/etc/hosts` for networking).
- No registry; instead, each application stores its settings in text files (like `.conf` files).
- Can be configured using both CLI (`nano`, `vim`) and GUI tools (e.g., GNOME Settings, KDE System Settings).

11. Software Management

Windows:

- Applications are installed using **.exe** or **.msi** installers.
- Software is managed via:
    - **Microsoft Store** (limited selection).
    - **Manual installation from third-party sources** (which can be risky).
    - **Chocolatey or Winget** (package managers for advanced users).
- Software often stores data in **Program Files** (`C:\Program Files\`) and the **Registry**.

Linux:

- Uses **package managers** to install and update software:
    - `apt` (Debian/Ubuntu)
    - `dnf` (Fedora)
    - `pacman` (Arch Linux)
    - `snap` and `flatpak` (universal package formats)
- Software is stored in well-defined locations (`/usr/bin`, `/etc`, `/var`).