

What is a system administrator?

A system administrator is a professional who maintains computer systems, servers, and networks of their clients. They are required to understand the specific requirement of their clients and accordingly recommend or suggest computer systems designs for them. Some of their job duties and responsibilities are to install and maintain systems for organizations and maintain as well as upgrade data cloud infrastructure.

System Administrator - Roles and Responsibilities

A system administrator plays a pivotal role in maintaining the health, efficiency, and security of computer systems within an organization. Their responsibilities are vast and varied, encompassing everything from monitoring system performance to ensuring security measures are up to date. Below is a detailed overview of the roles and responsibilities of a system administrator:

1. Monitor System Performance

- Regularly check system logs, CPU usage, memory usage, and network performance to ensure optimal functioning.
- Identify potential issues before they escalate by analyzing performance data and trends.

2. Perform Daily Security Backups and Restores

- Schedule and manage regular backups to prevent data loss.
- Ensure data integrity by periodically testing restore processes.

3. Security Audits and Monitoring

- Conduct regular security audits to identify vulnerabilities and ensure compliance with security policies.
- Use monitoring tools to detect and respond to security breaches and threats.

4. Technical Support

- Provide technical assistance to end-users for hardware, software, and network-related issues.
- Troubleshoot and resolve system problems to minimize downtime.

5. User Administration

- Manage user accounts, permissions, and access rights to ensure appropriate access to resources.
- Create, modify, and delete user accounts as needed.

6. Install and Configure Software and Hardware

- Set up new hardware, including servers, workstations, and peripheral devices.
- Install and configure operating systems, applications, and software updates.

7. Maintaining Networks and Network File Systems

- Oversee the functionality of network components such as routers, switches, and firewalls.
- Ensure network file systems are correctly configured and accessible to authorized users.

8. Backup and Disaster Recovery

- Develop and implement backup strategies to safeguard critical data.
- Create and maintain disaster recovery plans to ensure quick recovery from data loss events.

9. Operating Systems

- Install, update, and maintain operating systems across all devices.
- Optimize operating system performance and ensure compatibility with applications.

10. Create New Users

- Onboard new employees by creating user accounts and assigning necessary permissions.
- Ensure new users have access to the tools and resources required for their roles.

11. Database Administration

- Manage database servers, ensuring data availability and security.

- Perform database backups, recovery, and regular maintenance tasks.

12. Monitoring Systems

- Continuously monitor system health and performance using automated tools.
- Address anomalies and performance bottlenecks promptly.

13. Networking

- Maintain network infrastructure to ensure reliable and secure connectivity.
- Troubleshoot and resolve network issues to maintain uptime.

14. Patching Firmware and Software

- Regularly update firmware and software to protect against vulnerabilities.
- Test and deploy patches to minimize disruption to users.

15. Secure Configuration

- Implement security best practices in system configurations to protect against unauthorized access.
- Regularly review and update configurations to adapt to new security threats.

16. Security

- Enforce security policies and procedures to safeguard information assets.
- Use security tools and practices to detect, prevent, and respond to security incidents.

17. Troubleshoot Issues and Outages

- Quickly diagnose and resolve system issues and outages to minimize impact.
- Work with other IT professionals to address complex problems.

18. Configure Internal Systems

- Customize internal systems to meet organizational needs and improve efficiency.
- Ensure systems are integrated and functioning cohesively.

19. Documentation

- Maintain comprehensive documentation of system configurations, procedures, and changes.
- Use documentation to ensure continuity and facilitate troubleshooting.

20. Maintain Internal Documentation Through Wiki

- Create and update internal wiki pages to document processes, procedures, and best practices.
- Ensure documentation is accessible and useful for all team members.

21. Maintaining System

- Perform regular maintenance tasks to keep systems running smoothly.
- Update hardware and software as needed to prevent obsolescence.

22. Resetting User Passwords

- Assist users with password resets to maintain access security.
- Implement password policies to enhance security.

23. Upgrading Systems

- Plan and execute system upgrades to improve performance and functionality.
- Ensure compatibility and stability during and after upgrades.

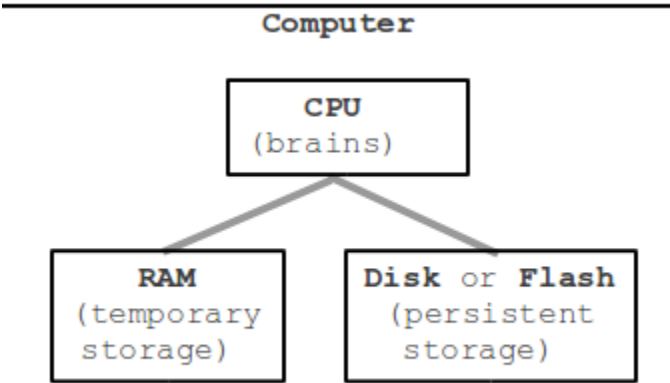
Hardware Guide

- Computers have two main parts: **hardware and software**
- Like piano (hardware) and music (software)
- In this section: hardware

The computer is an amazingly useful general-purpose technology, to the point that now cameras, phones, thermostats, and more are all now little computers. This section will introduce major parts and themes of how computer hardware works. "Hardware" refers the physical parts of the computer, and "software" refers to the code that runs on the computer.

Computer Hardware - CPU, RAM, and persistent storage

Now let's talk about the three major parts that make up a computer -- **CPU**, **RAM**, and **Persistent Storage**. These three are found in all computers: laptops, smartphones, and tablets.



The main components we'll be covering are the following

- CPU (Central Processing Unit)
- Motherboard
- RAM (Random Access Memory)
- HDD/SSD (Hard Disk Drive/Solid State Drive)
- PSU (Power Supply Unit)
- GPU (Graphics Processing Unit)
- Computer Tower/Case
- Computer Monitor
- Optical Drive CD/Blu-Ray

Central Processing Unit (CPU)

The central processing unit (CPU), also called a **processor**, is located inside the **computer case** on the motherboard. It is sometimes called the brain of the computer, and its job is to carry out commands. Whenever you press a key, click the mouse, or start an application, you're sending instructions to the CPU.

The CPU is usually a **two-inch ceramic square** with a **silicon chip** located inside. The chip is usually about the size of a thumbnail. The CPU fits into the motherboard's **CPU socket**, which is covered by the **heat sink**, an object that absorbs heat from the CPU.

A processor's **speed** is measured in **megahertz (MHz)**, or millions of instructions per second; and **gigahertz (GHz)**, or billions of instructions per second. A faster processor can execute instructions more quickly. However, the actual speed of the computer depends on the speed of many different components—not just the processor.

- The "brain" of the computer.
- Processes instructions from programs and controls how the computer operates.
- Faster CPUs can handle more tasks at once and perform them quickly.

RAM (random access memory)

RAM is your system's short-term memory. Whenever your computer performs calculations, it temporarily stores the data in the RAM until it is needed.

This short-term memory disappears when the computer is turned off. If you're working on a document, spreadsheet, or other type of file, you'll need to save it to avoid losing it. When you save a file, the data is written to the hard drive, which acts as long-term storage.

RAM is measured in megabytes (MB) or gigabytes (GB). The more RAM you have, the more things your computer can do at the same time. If you don't have enough RAM, you may notice that your computer is sluggish when you have several programs open. Because of this, many people add extra RAM to their computers to improve performance.

HDD (HARD DISK DRIVE)

The **hard drive** is where your software, documents, and other files are stored. The hard drive is **long-term storage**, which means the data is still saved even if you turn the computer off or unplug it.

When you run a program or open a file, the computer copies some of the data from the **hard drive** onto the **RAM**. When you **save** a file, the data is copied back to the **hard drive**. The faster the hard drive, the faster your computer can **start up** and **load programs**.

difference between an HDD (Hard Disk Drive) and an SSD (Solid State Drive) lies in their storage technology and performance. HDDs use spinning disks and mechanical parts, while SSDs use flash memory with no moving parts.

PSU (Power supply unit)

The power supply unit in a computer converts the power from the wall outlet to the type of power needed by the computer. It sends power through cables to the motherboard and other components.

Expansion cards

Most computers have expansion slots on the motherboard that allow you to add various types of expansion cards. These are sometimes called PCI (peripheral component interconnect) cards. You may never need to add any PCI cards because most motherboards have built-in video, sound, network, and other capabilities.

However, if you want to boost the performance of your computer or update the capabilities of an older computer, you can always add one or more cards. Below are some of the most common types of expansion cards.

Video card

The video card is responsible for what you see on the monitor. Most computers have a GPU (graphics processing unit) built into the motherboard instead of having a separate video card. If you like playing graphics-intensive games, you can add a faster video card to one of the expansion slots to get better performance.

Sound card

The **sound card**—also called an audio card—is responsible for **what you hear** in the speakers or headphones. Most motherboards have integrated sound, but you can upgrade to a dedicated sound card for higher-quality sound.

Network card

The **network card** allows your computer to communicate over a network and access the Internet. It can either connect with an **Ethernet** cable or through a **wireless** connection (often called **Wi-Fi**). Many motherboards have built-in network connections, and a network card can also be added to an expansion slot.

List of Input Devices

Given below is the list of the most common input devices along with brief information about each of them.

1. Keyboard

- A simple device comprising keys and each key denotes either an alphabet, number or number commands which can be given to a computer for various actions to be performed
- It has a modified version of typewriter keys

- The keyboard is an essential input device and computer and laptops both use keyboards to give commands to the computer
2. **Mouse**
 - It is also known as a pointing device
 - Using mouse we can directly click on the various icons present on the system and open up various files and programs
 - A mouse comprises 3 buttons on the top and one trackball at the bottom which helps in selecting and moving the mouse around, respectively
 - In case of laptops, the touchpad is given as a replacement of the mouse which helps in the movement of the mouse pointer
 3. **Joy Stick**
 - It is a device which comprises a stick which is attached at an angle to the base so that it can be moved and controlled
 - Mostly used to control the movement in video games
 - Apart from a computer system, a joystick is also used in the cockpit of an aeroplane, wheelchairs, cranes, trucks, etc. to operate them well
 4. **Light Pen**
 - It is a wand-like looking device which can directly be moved over the device's screen
 - It is light-sensitive
 - Used in conjunction with computer's cathode ray tube
 5. **Microphone**
 - Using a microphone, sound can be stored in a device in its digital form
 - It converts sound into an electrical signal
 - To record or reproduce a sound created using a microphone, it needs to be connected with an amplifier
 6. **Scanner**
 - This device can scan images or text and convert it into a digital signal
 - When we place any piece of a document on a scanner, it converts it into a digital signal and displays it on the computer screen
 7. **Barcode Reader**
 - It is a kind of an optical scanner
 - It can read bar codes
 - A source of light is passed through a bar code, and its aspects and details are displayed on the screen

List of Output Device

The commonly used output devices have been listed below with a brief summary of what their function is and how they can be used.

1. **Monitor**
 - The device which displays all the icons, text, images, etc. over a screen is called the Monitor
 - When we ask the computer to perform an action, the result of that action is displayed on the monitor
 - Various types of monitors have also been developed over the years
2. **Printer**
 - A device which makes a copy of the pictorial or textual content, usually over a paper is called a printer

- For example, an author types the entire book on his/her computer and later gets a print out of it, which is in the form of paper and is later published
- Multiple types of printers are also available in the market, which can serve different purposes

3. **Speakers**

- A device through which we can listen to a sound as an outcome of what we command a computer to do is called a speaker
- Speakers are attached with a computer system and also are a hardware device which can be attached separately
- With the advancement in technology, speakers are now available which are wireless and can be connected using BlueTooth or other applications

4. **Projector**

- An optical device which presents an image or moving images onto a projection screen is called a projector
- Most commonly these projectors are used in auditoriums and movie theatres for the display of the videos or lighting
- If a projector is connected to a computer, then the image/video displayed on the screen is the same as the one displayed on the computer screen

5. **Headphones**

- They perform the same function as a speaker, the only difference is the frequency of sound
- Using speakers, the sound can be heard over a larger area and using headphones, the sound is only audible to the person using them
- Also known as earphones or headset