

Grade: 50/50 A+
-----------------

## **An Overview of Operating System Services and Functions**

Alejandro Ricciardi

Colorado State University Global

CSC300: Operating Systems and Architecture

Joe Rangitsch

June 15, 2023

## **An Overview of Operating System Services and Functions**

The Operating System (OS) plays a critical role in computer systems operations. The OS acts as an intermediary between the user, applications, and hardware. It manages the different hardware components, controls and distributes resources, and performs services such as providing access to stored files and networking for the application and the user. Furthermore, the tasks performed by the OS are essential to the operation of the computing system, they are generally referred to as services, and the OS provides several services. In this essay, I will discuss Program Execution, Input-Output Operations, File-system Manipulation, Error Handling, Resource Management, Security, and Networking services. Finally, by supplying vital services, the Operating System provides to applications and the user a computer system that is stable, secure, and efficient.

First, I will discuss different services, starting with the Program Execution service, the main goal of a computer system is to allow users to execute programs. The service is responsible for loading programs in memory and executing them, it manages the resources that the programs need, and when they are terminated it is responsible for cleaning up and releasing the resources that were allocated to those programs.

Another service is the Input-Output Operations service, which is responsible for managing and accessing I/O devices through driver software and/or the hardware abstraction layer (HAL). I/O devices can be categorized as storage, communications, user interface, and others (John Bell, 2006). One of the services related to Input-Output Operations that is part of the Windows 11 Operating System is the Human Interface Device Service, it activates and maintains the use of hot buttons on keyboards, remote controls, and other multimedia devices.

Next is the File-System Manipulation service, which provides applications and users access to files stored on storage devices. It accomplishes the task of opening files, closing files, and creating and deleting files on storage devices. It also provides an interface to create, read, update, and delete directories, and an interface to back up the entire file system. One of the services related to File-system manipulation that is part of the Windows 11 Operating System is The Storage Service, it provides enabling services for storage settings and external storage expansion.

An additional service in the list is the Error Handling service, which handles errors that can occur in the CPU, in Input-Output devices, etc. It ensures that an error does not occur frequently and tries to fix the error. It also scans for errors that occur during a task and it must prevent processes from coming to a deadlock. (GeeksforGeeks, 2023). A deadlock event happens, for example, when two or more programs get hung up waiting for each other to release some resources (Stallings, 2018). Windows Error Reporting (WER) is a service related to the Error Handling service, it reports errors when programs stop working or responding and allows existing solutions to be delivered. Also, it allows logs to be generated for diagnostic and repair services.

Next on the list is the Resource Management service. System resources are shared between various processes, applications, and the user. The service manages resource sharing, it uses CPU Scheduling Algorithms to allocate CPU time among processes. It manages memory allocation, controls I/O device communications, and provides access and manages secondary storage (Isaac Computer Science). For example, CPU Scheduling Algorithms prioritize CPU access by utilizing interrupts, interrupts are a "mechanism by which other modules (I/O, memory) may interrupt the normal sequencing of the processor" (Stallings, 2018).

Another service in the list provided by the OS is Security, which provides protection against internal and external unauthorized access to the computer system resources. It manages how users, processes, applications, or programs can access the system resources. It also provides user authentication by utilizing usernames and passwords and protects I/O devices against unauthorized access.

The last service on the list is the Networking service, “This service enables the communication between devices on a network, such as connecting to the internet, sending and receiving data packets, and managing network connections” (GeeksforGeeks, 2023). A Windows Operating System service that is related to the Networking service is the DHCP Client service, it registers and updates IP addresses and DNS records for the computing system. Another Windows Operating System service that is related to the Networking service is DNS Client service, it acquires the Domain Name System (DNS) names and registers the full computer name for the computer system.

To summarize, I discussed Program Execution, Input Output Operations, File-system Manipulation, Error Handling, Resource Management, Security, and Networking services which are critical to the operation of computer systems. An Operating System offers many other services; nonetheless, the few services discussed in this paper show that the Operating System is vital to a computer system’s operations, it acts as an intermediary between the user, applications, and hardware. Furthermore, by supplying those services, the OS provides a stable, secure, and efficient environment for applications to run proficiently and for the user to be productive without the burden of understanding the intricacies of hardware operations.

## References

GeeksforGeeks. (2023, June 7). *Operating System Services*. GeeksforGeeks.

<https://www.geeksforgeeks.org/operating-system-services/>

Isaac Computer Science. (n.d.).

[https://isaacomputerscience.org/concepts/sys\\_os\\_resource\\_management?examBoard=all  
&stage=all](https://isaacomputerscience.org/concepts/sys_os_resource_management?examBoard=all&stage=all)

John Bell (2006). *Operating Systems Course Notes*. University of Illinois at Chicago

[https://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems/13\\_IOSystems.html](https://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems/13_IOSystems.html)

Stallings, W. (2018). *Operating systems: Internals and design principles*. Pearson.