Operating System Services For Wide Area Applications

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Abstract

we argue for the power of providing a common set of OS services to wide area applications, including mechanisms for resource discovery, persistent storage, process execution, resource management, authentication, Commination, and security.

Introduction

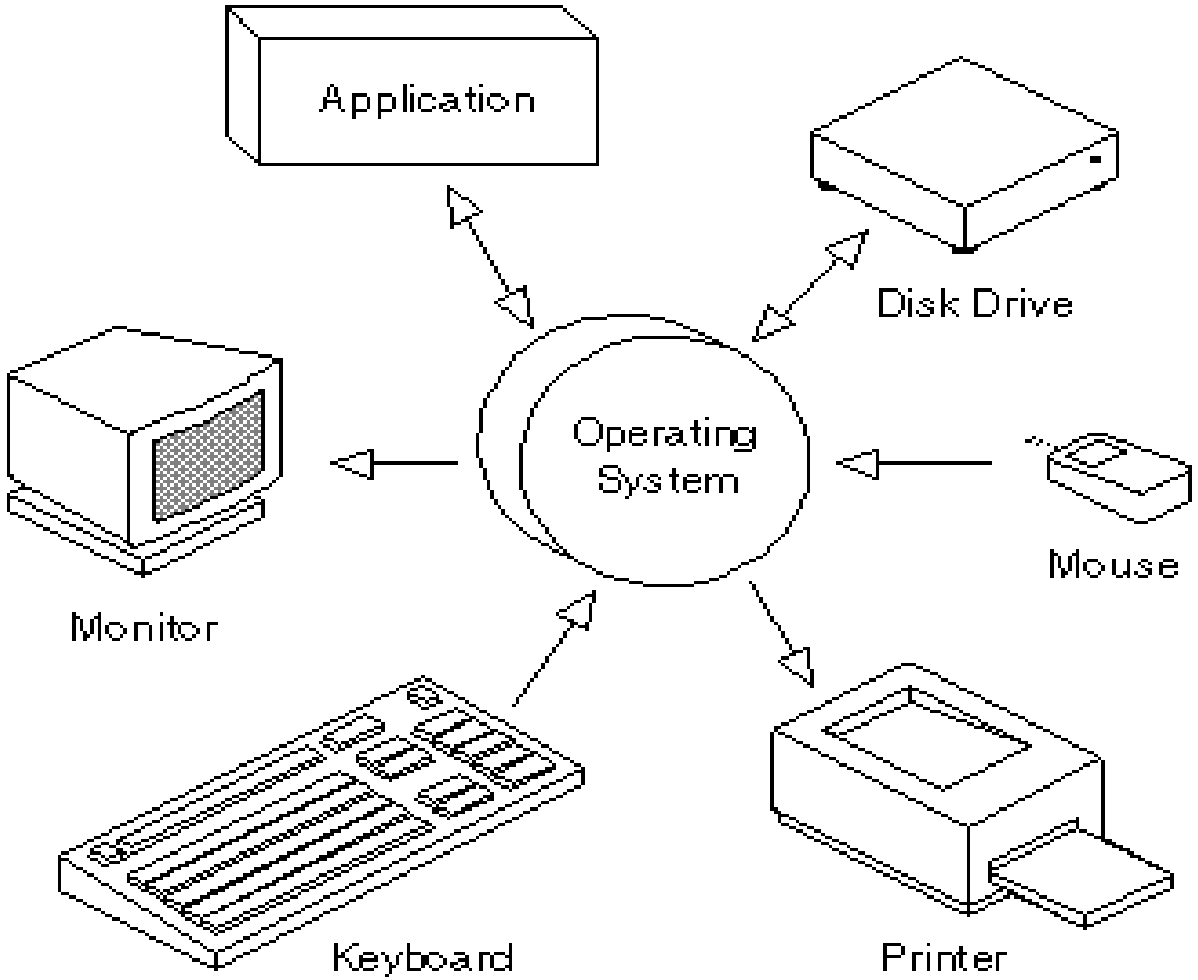
- While the World Wide Web has made geographically distributed read-only data easy to use, geographically distributed computing resources remain difficult to access, As a result, wide area applications that require access to remote CPU cycles, memory, or disk must be programmed.

The Goal

The goal of WebOS is to provide a framework to assist application developers in utilizing programmable and active network components. Provide a platform for the development and deployment for wide-area applications.

Operating System Services that are helpful to users

- File System Operations
- Program Execution
- Error Detection
- I/O Operations
- Protection and Security
- Commination



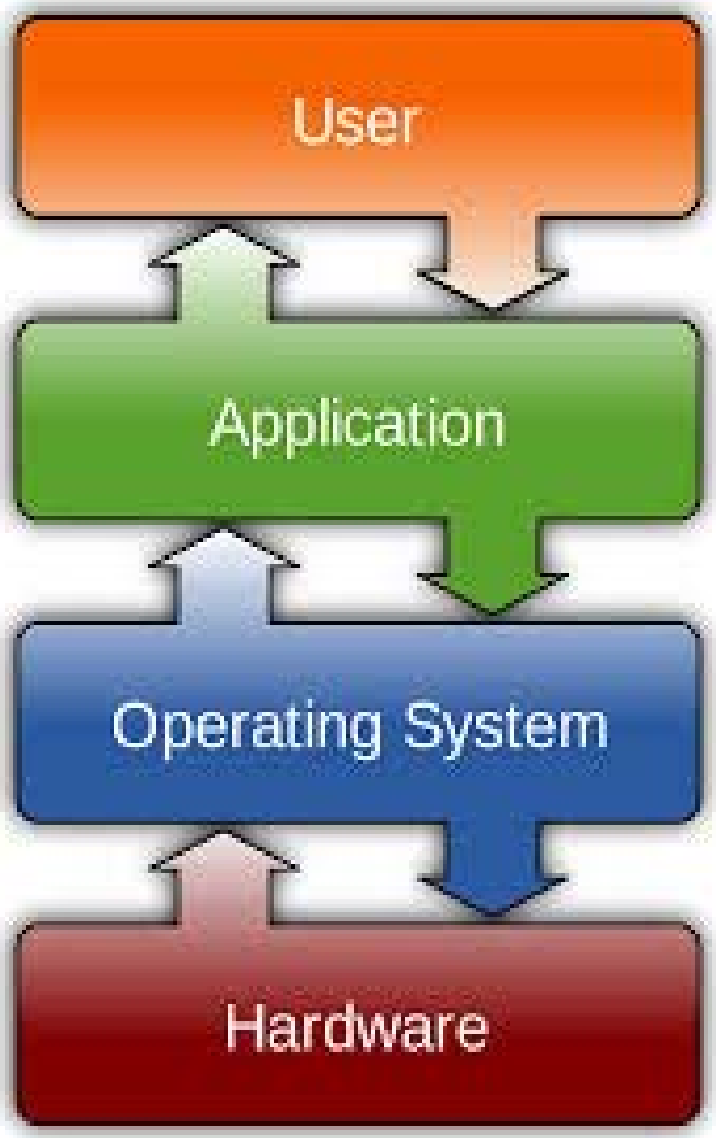


Figure1 : Operating Systems and its relationship with various components of the computer [1]

File System Operations

Computer can store file on the disk ,Each of these media has its own properties like speed, capacity data transfer rate.

- OS program need to read a file or write a file .
- OS Control the permission of a give file .
- OS provides creating, deleting and editing of file.
- OS Provides an management of directories .

Program Execution

Running a program involves the allocating and deallocating memory ,CPU scheduling in case of multiprocessor .These function cannot be given to the user-level programs. So user-level programs cannot help the user to run programs independently without the help from operating systems.

Error Detection

Errors occur in operating system which are malfunction in the system can occur anytime and anywhere ,Error may occur in CPU ,in I/O devices or in the memory hardware .

- OS constantly remains aware of possible errors.
- OS takes the appreciate action to ensure correct and consistent commuting .

I/O Operations

Each program requires an input and produces output this involves the use of I/O .The Operating system hides the user the details of underlying hardware for I/O.

For efficiently and protection users cannot control I/O so this service cannot be provided by user-level programs.

Protection and Security

Protection refers to mechanism or a way to control the access of programs, processes, or users to the resources defined by computer systems. Following are the major activities of an operating system with respect to protection .

- The OS ensures that all access to system resources is controlled.
- The OS ensures that external devices are protected from invalid access attempts.

Commination

In the commuter system, Processes needs to communicate, and to exchange data. This is referred to as InterProcess Communication.

- Tow Processes may require data to be exchanged between them.
- Communication may be implemented either by Shared Memory or by Message Passing.

PROCESS CONTROL

In WebOS, executing a process on a remote node should be as simple as the corresponding local operation. The underlying system is responsible for authenticating the identity of the requester and determining if the proper access rights are held. Precautions must be taken to ensure that the process does not violate local system integrity and that it does not consume more resources than allocated to it by local system administrators.

Web Operating System (WOS)

- The Web Operating System (WOSTM) is a virtual operating system that supports and manages distributed/parallel processing on the Internet. The WOS is a versioned system, in which different versions not capable of dealing with a particular request for service, then pass it on to another version, as currently done for packet routing. Generalized software configuration techniques, based on a demand The solutions proposed are highly coupled to the nodes' operating system.

WIDE-AREA FILE SYSTEM

- To support replication and wide-scale sharing, WebOS provides a cache coherent wide-area file system. WebOS extends to wide-area applications running in a secure HTTP name space the same interface, caching, and performance of existing distributed file systems .In addition, we argue for benefit of integrating the filesystem with application-controlled efficient wide-area communication .

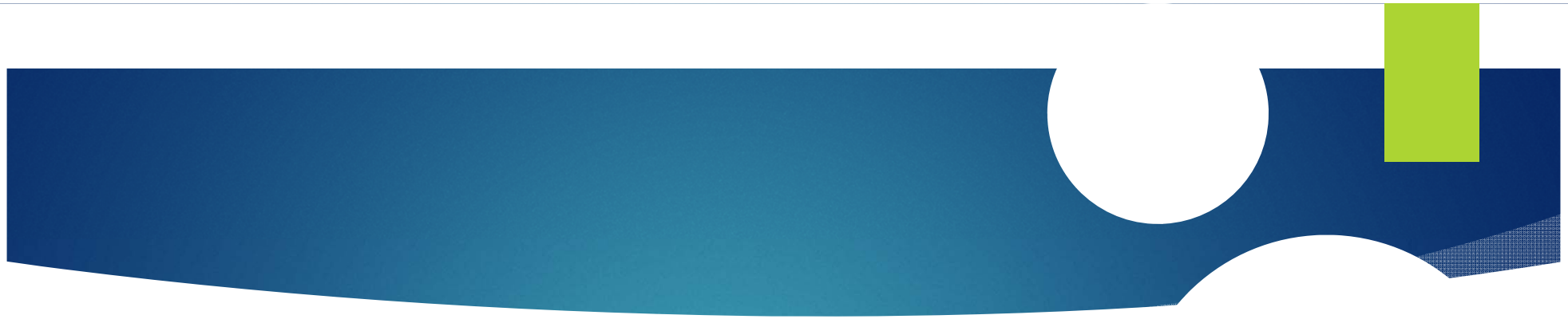
SECURITY AND AUTHENTICATION

To support applications operating across organizational boundaries, WebOS defines a model of trust providing both security guarantees

and an interface for authenticating the identity of principals . A key enabling feature is fine-grained control of capabilities provided to remote processes executing on behalf of principals.

INTERNET CHAT

Internet chat allows for individuals to enter and leave chat rooms to converse with others present in the same logical room. in our implementation, chat rooms are implemented as webfs files accessed by smart clients. The file system interface is well-matched to chat semantics in a number of ways: (i) file appends and reads abstract away the need to send messages (ii) the chat file provides a persistent log of chat activity, and (iii) access control lists allow for



private and secure (through webfs encryption) chat rooms. for scalability, we allow multiple webfs servers to handle client requests for a single file (room). each web fs server accumulates updates, and periodically propagates the updates to other servers in the webfs group, who in turn transmit the updates to local clients. smart clients choose the least loaded webfs server for load balancing and connect

to alternative servers on host failure or network partition for fault transparency.

Remote Compute Engine

Sites with unique computing resources, such as supercomputer centers, often wish to make their resources available over the Internet. Using WebOS, we allow remote procuring Internet weather. In exchange for the weather report, the user implicitly agrees to allow the applet to execute traceroute to a subset of server-determined sites and to transmit the result back to the server. Using these results from multiple sites, the service is able to construct fairly comprehensive snapshots of Internet weather.

GLOBAL NAMING

Many wide-area services are geographically distributed. To provide the best overall system performance, a client application must be able to dynamically locate the server able to deliver the highest quality of service. In WebOS, global naming includes mapping a service name to multiple servers, an algorithm for balancing load among available servers, and maintaining enough state to perform fail-over if a server becomes unavailable. These operations are performed through Smart Clients

, which flexibly extend service-specific functionality to the client machine.