

COMPUTER SYSTEMS

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1 Context Switching

One of the essential features of a modern operating system is Context Switching. Process of storing and restoring state or context of a CPU so that execution can be resumed from the same point at some later point in time is known as Context Switching. Context Switching enables multiple processes to share a single CPU. Usually the contexts contains Stack Pointer SP, Base address and the I/O State. Support from hardware is very essential for having efficient context switch.

To support good context switching, modern systems have two different modes of execution.

- * User mode : User applications run in this mode.
- * Supervisor mode : Kernels run in this privileged mode.

The shift between these two modes happen because of the interrupts. There are two kinds of interrupts

- * Software interrupts
- * Hardware interrupts

2 Memory Protection

An extra register known as block register is added to the context which is used to limit the memory used by the processes. This makes sure that the processes do not access the locations outside its memory block.

3 I/O State

Processes in Unix, have an I/O table associated with them. Each entry in the I/O table points to an object which implements a common I/O interface(which includes read and write operations).

4 Inter-process communication

Inter-process communication (IPC) is a set of techniques for the exchange of data among multiple threads in one or more processes.

* Unix pipes are one of the first and most successful IPC mechanisms. It is a very commonly used feature in Unix command line. Symbol | is used to create pipes in Unix

* Remote Procedure Call (RPC) is a inter-process communication mechanism, that allows a computer program to cause a subroutine or procedure to execute in another address space. The main challenge in RPC is to make local procedure calls and remote procedure calls to look as similar as possible and is hidden from the user.

Some of the issues that are to be taken care with Remote Procedure Calls include

- Argument Marshalling
- Naming and addressing
- Reliability of procedure calls.