Desarrollo de Aplicaciones en Red

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What an operating system is?

- It is an essential part of any computer.
- It manages the computer hardware.
- It is the intermediary between the user and the hardware.
- The purpose is to provide a secure environment where the user can execute programs in a convenient and efficient manner.


OS tasks

- In general, the different operating system covers different needs from the user and the hardware. For example:
  - *Mainframe OS are designed to optimize hardware;*
  - *PC's OS provides resource for gamming, applications and everything else.*
  - *OS for handheld are designed to provide a manageable environment for the user.*


Computers organization

- Elements from a computer (von Neumann model)
- The processes that run a computer when it starts consist in:
- Initial program (bootstrap program) allocated in an EEPROM (firmware)
- The bootstrap's task is to load and execute the kernel
- The OS start the init process and wait the next event
- The event is an interrupt (hardware/software)
- The OS process the signal through an operation called system call
  - The computer with the appropriate service routine handles each interrupt.
  - The routine can be handled by a interrupt vector, which point to the right device (usually the first 100 locations of memory)

How a modern OS works
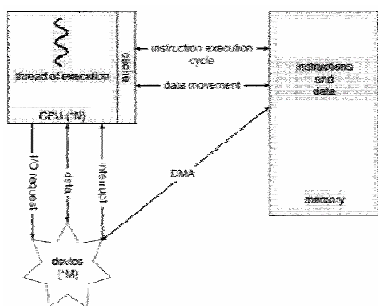
Process execution environment
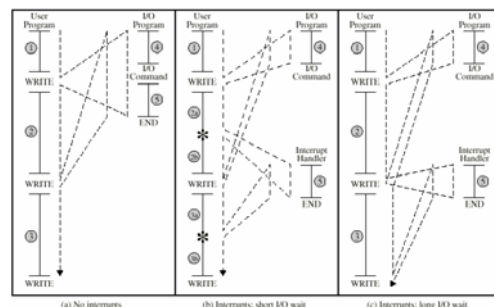
How a modern OS works

- A **device controller** handled the different devices presenting to it a uniform interface to the rest of the OS.
- The device controller is in charge to transfer to its local buffer at the end informs to the device via interrupt that it finished.
- However, how its take so much time it is possible to use DMA to transfer high volume information. In this way, CPU is free to do other things. Only one interrupt is emitted to inform the end of the process.

Distributed Systems

- A DS is a collection of physically separate, possibly heterogeneous computers that are networked to provide the users with access to the resources that it maintain. Access to a shared resource increases computation speed, functionality, data availability, and reliability.
- DS depends on networking for their functionality.
- A computer running on a network act autonomously, although is aware of the network and is capable to communicate with other computers.
- A computer with a distributed operating system is a less autonomous environment.

Computing Environment

- **Traditional environment**
- **Client-Server Computing**
- **Peer to Peer Computing**
- **Web-based Computing**

Computing Environment

- **Traditional environment**
  - It is difficult to define what a traditional environment is, because of grow up of "office environment". Now a day the Web is reducing the boundaries of traditional computing. The lower cost of computers and communications let to home users access more data.
- **Client-Server Computing**
  - As PCs have become faster and cheaper there was a change from centralized architecture and from terminals accessing a central server to a model where PCs are decentralized servers which attend other PCs. Usually a server is a computer that attends request from clients.

Computing Environment

- **Peer to Peer Computing**
  - In a similar way in a P2P model PCs act as client and server, but in an improved way because, there is not a centralized server. In order to participate in this scheme a node must first join to the network's peers taking the role of server or client.
  - The determination of what service is available is done in the one of two ways:
  - The node register its service in a centralized lookup service, clients consult the server and later establish direct link with the provider
  - A peer broadcast a request. The node or nodes respond the request. A discovery protocol is necessary for it.
- **Web-based Computing**
  - Web computing has increased the emphasis on networking because of their applications. This new tendency let to access high volume of data through the web components.

Advantages DS over Centralized System

- *Economics*
  - Better relation price/performance for example respect to Mainframes
- *Velocity*
  - 1000 CPUs x 20 MIPS = 20000 MIPS, superior a un Mainframe
- *Distributed Applications*
  - Industrial distributed system
  - Commercial distributed system
  - When a node falls it does not affect the system
  - Incremental grow up
  - New nodes can be added
- *Reliability*

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Advantages DS over independent machines

- *Sharing data*
  - Accessing to common data from different user
- *Sharing Device*
  - Sharing expensive device (printers, memory, cpu)
- *Communication*
  - Easy communication (email)
- *Flexibility*
  - Distributed and balanced jobs

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Disadvantages

- *Software*
  - There is a lack of software for using in this environments
- *Network communication*
  - Excess of load on the network
- *Security*
  - Access to share data

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