Introduction

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Choosing an operating system
What is important when choosing an operating system?
What is an operating system?

Abstraction, virtualisation and managing of resource.

- **Abstraction**
  - How do we create an abstraction layer that provides an environment for programming of a process?

- **Virtualisation**
  - How do we create the image of dedicated hardware while in fact we have several process sharing the same hardware?

- **Resource management**
  - Given that we have limited amount of resources, how do we share them in a fair way?
An operating system

A well structured world

a clean interface

The Operating System

a complete mess

Hardware
Why is it hard to implement an operating system?
layers of abstractions

Nice world
a clean interface
OS A
a complete mess
Hardware X

Same world
same interface
OS A
another mess
Hardware Y

Different world
strange interface
Windows
same mess
Hardware Y
yet another layer

Java world

Java API
Java VM
clean A
OS A

Java API
Java VM
nice B
OS B

Java API
Java VM
standard C
OS C
virtual operating systems

World A

OS A

clean A

Virtual OS A

nice B

OS B

Virtual OS A

standard C

OS C

clean A
provide isolation and control

Virtual OS A  Virtual OS A  Virtual OS B

clean A

OS A
Some history - way back

- 1960
- Large single job machines, batch processing
- Operating system often only libraries to handle hardware.

BESK - KTH 1953, 512 word memory
also long time ago

- 1970 - 1980
- Multiuser systems, minicomputers (very large)
- Time sharing, virtual memory, hard drives, ...
- Birth of Unix and C

PDP-10 - KTH 1970 ca, 256 Kiword memory
before you were born

1980 - 1990
- The personal computer.
- Manual switching between programs.
- MS-DOS, Mac OS, ..

Mac or IBM PC?
The *nix war

1980 - 2000
Unix flavors become the leading operating systems for everything but personal computers.
Everyone wants a standard - their own.

AIX, HP-UX, Solaris, Ultrix ...
at the same time

Gnu is Not Unix

- 1983 -
- Providing a free (as in speech, not beer) operating system with everything you could need.
- Everything was in place ... the kernel will soon be ready.
Hello everybody out there using minix -

I’m doing a (free) operating system (just a hobby, won’t be big and professional like gnu) for 386(486) AT clones. : :

PS. Yes - it’s free of any minix code, and it has a multi-threaded fs. It is NOT portable (uses 386 task switching etc), and it probably never will support anything other than AT-harddisks, as that’s all I have :-(

- Linus Torvalds
Linux - the kernel for GNU

- 1993 -
- Linus Torvalds
- A monolithic system targeting the Intel 386 CPU.
- Linux was born and became the kernel for GNU.
Share of Top500 Super Computers
Three options:

- Install a *virtual machine* on top of your regular system.
- Take an old laptop and boot it from scratch.
- Join the good side.
What's next