

Pengurusan Perkakasan & Sistem Pengoperasian

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Agenda

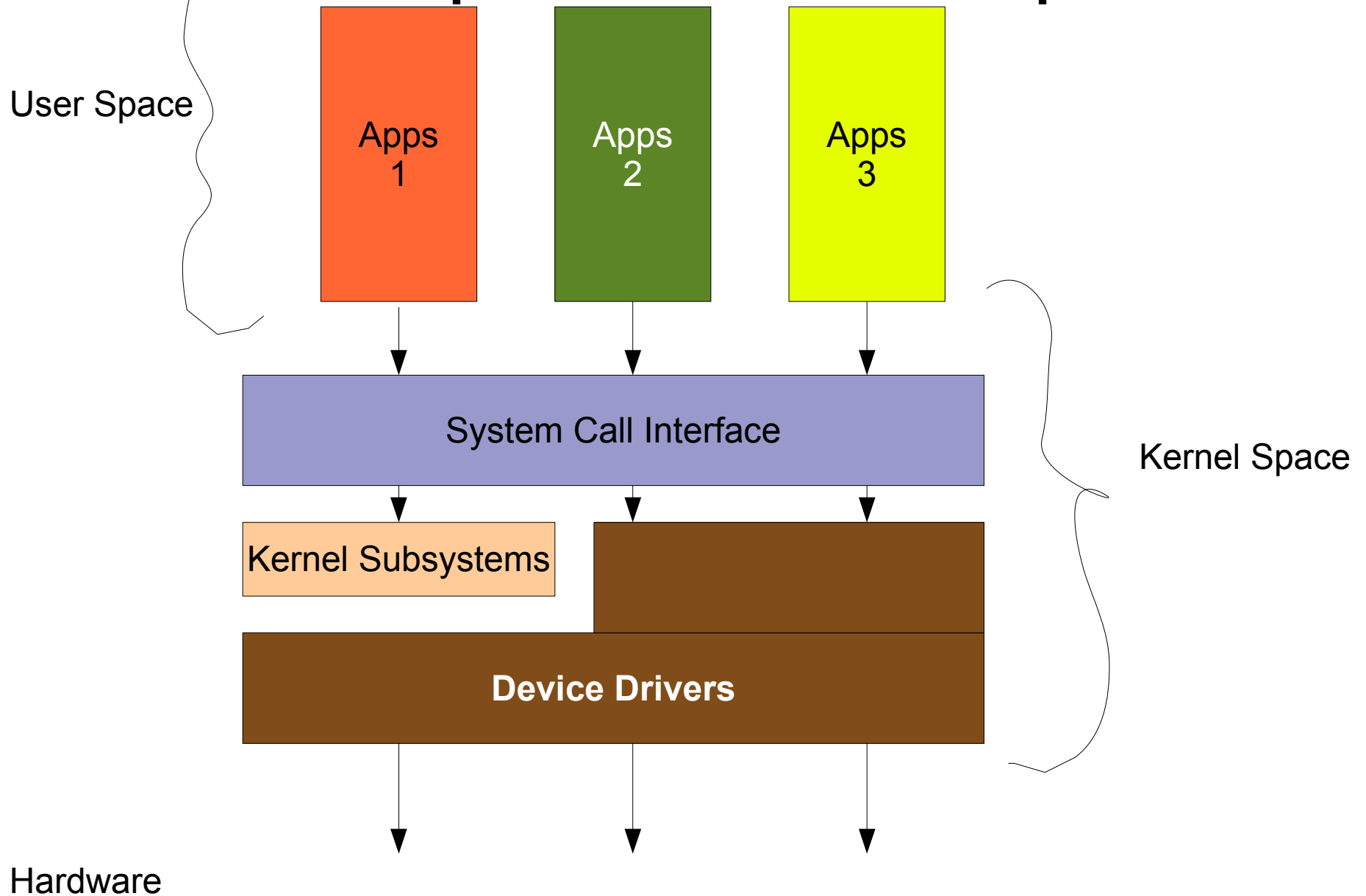
- Operating Systems
- Windows and Free/Open Source Operating Systems
- Distributed Computing concepts
 - client server, peer to peer

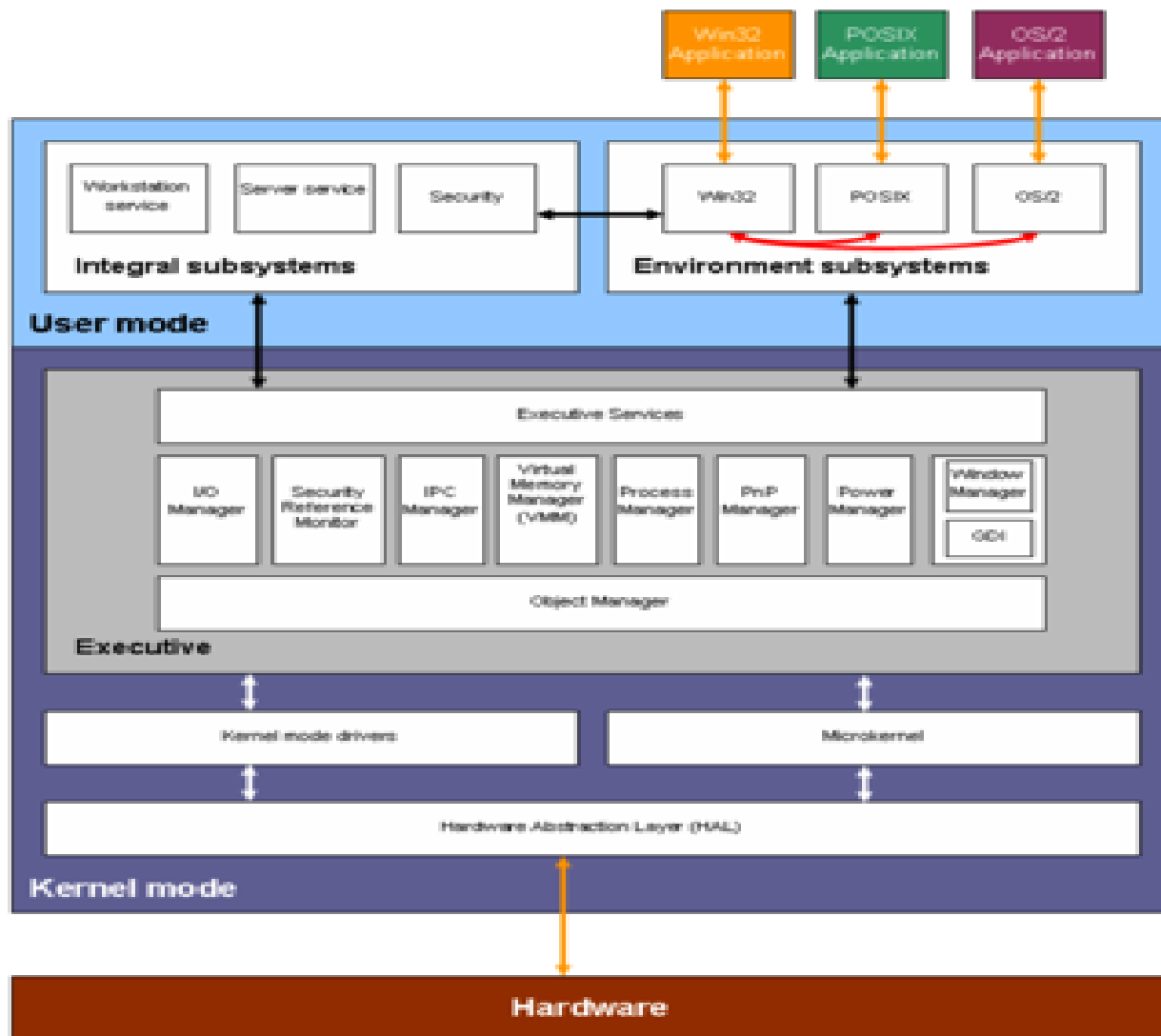
Operating Systems

Operating Systems

- Software Program that manages hardware and software resources of a computer system
 - written in a programming language
 - compiled on different architecture
 - run in active memory
- Provides a base for software to be written without having to know the details of the hardware
 - “Interface”

Kernel Space vs User Space





Basic Tasks

- Controlling and allocating memory
- Prioritizing tasks and instructions
- Managing Files
- Controlling inputs and outputs
- Support for networking protocols

Process Management

- Everything runs inside a process
 - with older OS (i.e. DOS) one process at a time
- Modern OS
 - many processes at one time (multi-tasking)
- With 1 processor, multi-tasking is in essence switching very quickly from one process to another
- More processes – smaller is the timeshare slice

Memory and Storage Management

- Each process must have enough memory to execute
- Different types of memory system must be used effectively
 - Cache, RAM, Hard Disk
- Processor access one memory location at a time
- Virtual memory is a technique use to information from RAM to hard disk
 - swapping

Types of Memory

- High speed cache
 - fast, small amount of memory
- Main Memory
 - RAM measured in megabytes
- Secondary Memory
 - magnetic storage

Device Management

- OS 'communicate' with hardware through a program called 'driver'
 - written in low level languages
- Normally drivers are run when device is required
- Drivers are normally released by third party
- Input and outputs from devices are managed via queue or buffers
 - i.e. keyboard, network interface card `

File Systems

- Information needs to be kept somewhere
 - for long term storage
 - temporary memory is not sufficient
- OS has a component so that user space program can deal with the file system via systems calls
 - i.e. `open()`, `read()`, `write()`
 - file system abstraction includes (Unix) files, directory, entries, inodes, mount points

Distributed Systems

Distributed Systems

- Improvement of computing power (cheaper) and fast speed networking makes it feasible to have:
 - a system with many CPUs
 - connected via high speed network
 - decentralised and parallel computing
- Using two or more computers communicating over network to accomplish a common task or objective
 - types of hardware, OS, software used could be different depending on nature of project

Architectures

- Client-server
 - Smart client code contacts the server for data, then formats and displays it to the user. Input at the client is committed back to the server when it represents a permanent change.
 - Web-server
- Tightly-coupled (clustered)
 - Refers to a set of highly integrated machines that run the same process in parallel, subdividing the task in parts that are made individually by each one, and then put back together to make the final result.
 - e.g High Performance Computing, Grid,

Architectures (2)

- Peer-to-peer
 - an architecture where there is no special machine or machines that provide a service or manage the network resources. Instead all responsibilities are uniformly divided among all machines, known as peers.
 - e.g Bit Torrent, Skype

Proprietary vs Free/Libre Open Source Operating Systems

Key Differences

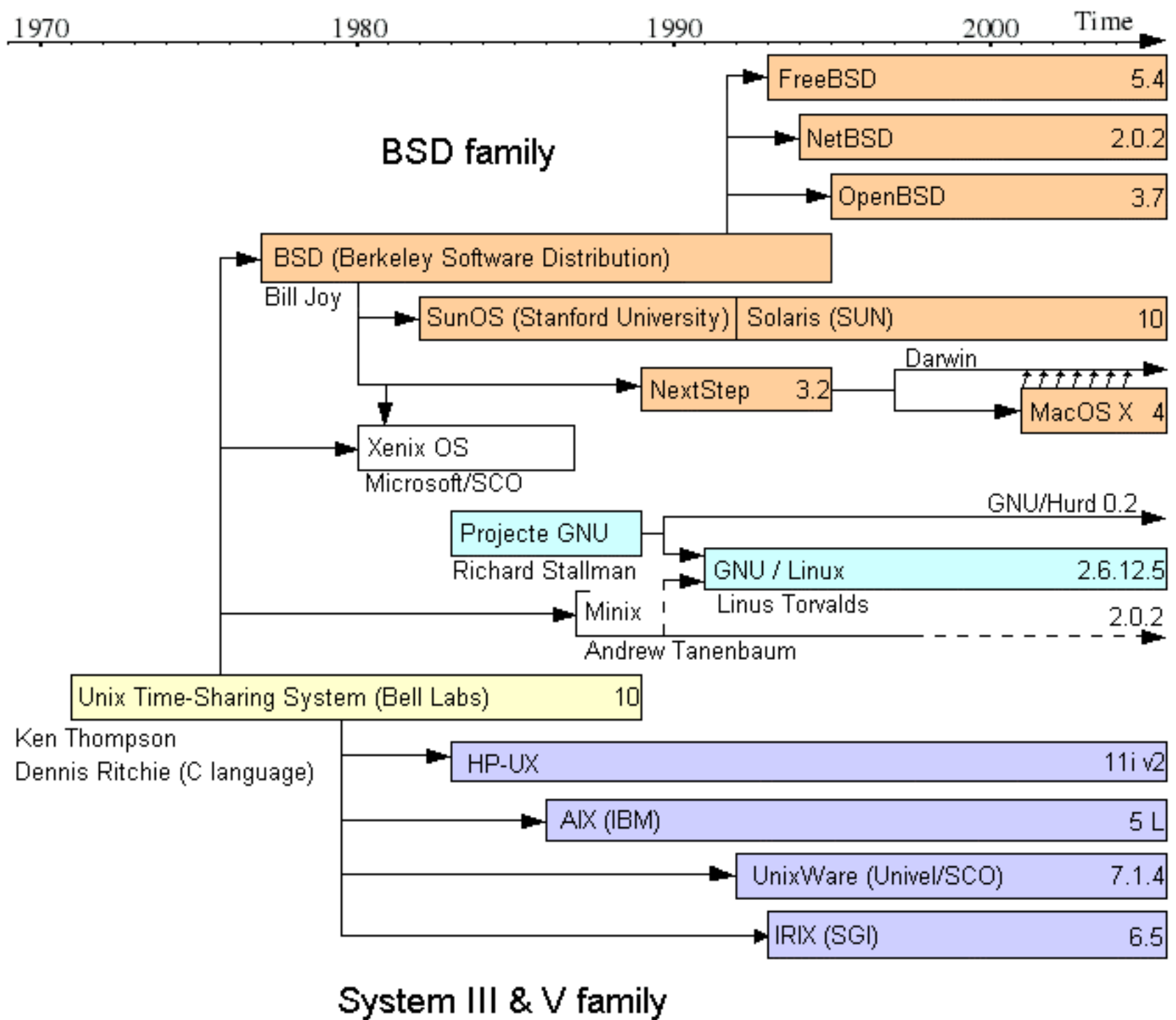
- Licensing Terms
 - How can I use it?
- Accessibility to Source Code
 - Can I see and modify the code?
 - .. and sell
- Development environment
 - open versus closed
- Support
 - Free , community , paid , how long?

Other issues

- Economics
 - almost free, use \$\$ on hardware
- Usage
 - stability
 - security
 - good code

Proprietary OS

- Windows Family
 - everyone knows this
- Commercial Unix
 - Solaris
 - Mac OS
 - HPUNIX
 - SCO
- Commercial Linux
 - RedHat Enterprise
 - Suse



Free and Open Source OS

- Linux
 - by Linux Torvalds
 - popular on desktop and server on multiple architectures
 - Linux is a kernel by it self therefore need applications
 - Applications + Linux Kernel = Distributions
 - Different distributions may have different installer, software management
 - Popular choice on desktop/notebooks due to availability of drivers



Free Open Source Software

- FreeBSD - <http://www.freebsd.org>
 - very stable operating systems, came into the picture much earlier than Linux
- OpenBSD - <http://www.openbsd.org>
 - very stable *BSD project focusing on security
 - mostly popular on the server side
- NetBSD - <http://www.netbsd.org>
 - another *BSD project focusing on as many architecture as possible



Free Open Source Software

- Other than the OS there are thousands of Free and Open Source Software available
 - can also run on proprietary OS
- Office
 - OpenOffice
- Database
 - postgresql, mysql
- Servers
 - Sendmail, Apache, Bind, Samba

Demo + Q & A

References

- <http://www.wikipedia.com>
- <http://www.howstuffworks.com>