

OS Lab

Session 1: Introduction

AUT – CEIT

Instructor: @MerajNouredini

Fall 2017

Introduction to class

Syllabus

- Introduction
- Linux file system
- Process in Linux
- Programming in Linux
- Shell programming

Syllabus

- Interaction with Linux kernel
- Process programming
- Multi-Threading
- Installing a new kernel
- Kernel module programming

Grading

- Class Activities 7
- Exercises 6
- Final Exam 5
- Final Project 2
- Other Activities $2_{(\max)}$

Reference

- Advanced Linux Programming by Mark Mitchell
- <http://randu.org/tutorials/threads>
- <http://www.cs.kent.edu/~ruttan/sysprog/lectures/multi-thread/multi-thread.html>

Part I

Introduction to Unix and Linux

Unix



Ken Thompson and Dennis Ritchie

Unix



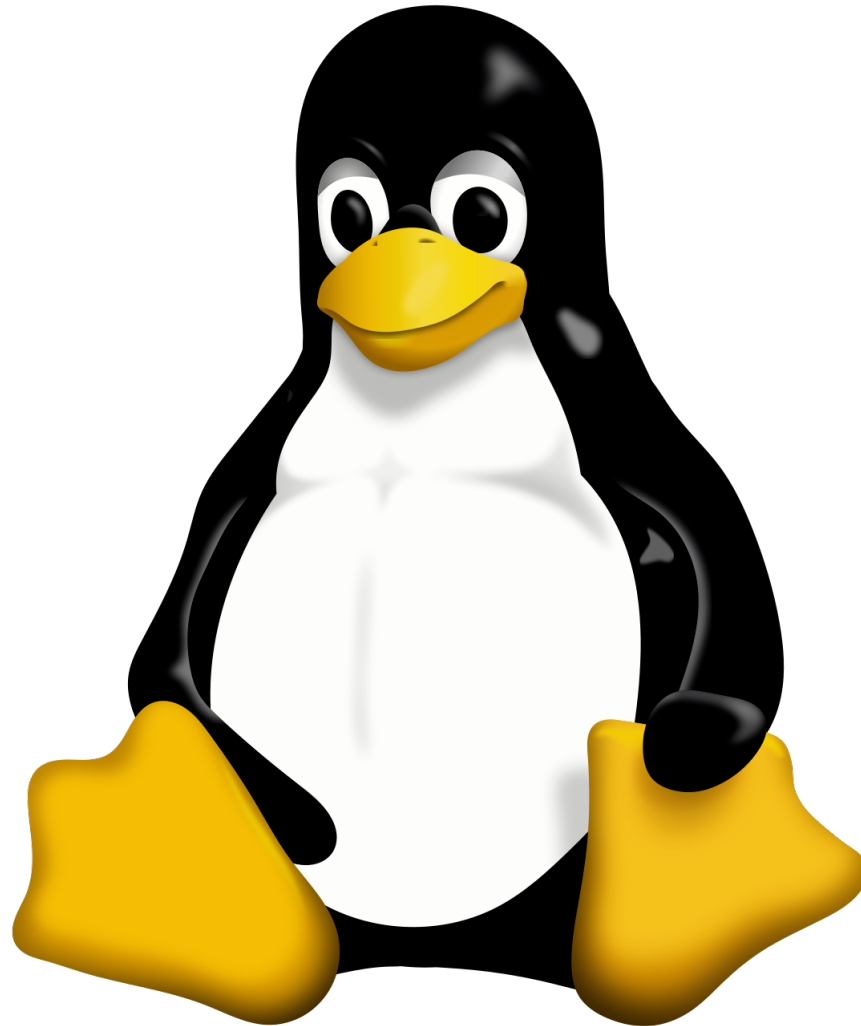
Bell Labs

Unix

In 1979, Dennis Ritchie described their vision for Unix:

*“What we wanted to preserve was not just a good environment in which **to do programming**, but a system around which a fellowship could form. We knew from experience that the essence of communal computing, as supplied by remote-access, time-shared machines, is not just to type programs into a terminal instead of a keypunch, but **to encourage close communication**.”*

Linux



Linux



Linus Torvalds

LINUS TORVALDS

CREATOR OF LINUX

AND DAVID DIAMOND

JUST FOR

THE STORY OF AN ACCIDENTAL REVOLUTIONARY

FUN

Linux

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. This has been brewing since april, and is starting to get ready. I'd like any feedback on things people like/dislike in minix, as my OS resembles it somewhat (same physical layout of the file-system (due to practical reasons) among other things).

I've currently ported bash(1.08) and gcc(1.40), and things seem to work. This implies that I'll get something practical within a few months, and I'd like to know what features most people would want. Any suggestions are welcome, but I won't promise I'll implement them :-)

Linus (torvalds@kruuna.helsinki.fi)

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

Open Source

In 1997, Eric Raymond published The ***Cathedral and the Bazaar***, a reflective analysis of the hacker community and free software principles. The paper received significant attention in early 1998, and was one factor in motivating Netscape Communications Corporation **to release their popular Netscape Communicator Internet suite as free** software. This source code subsequently became the basis behind SeaMonkey, Mozilla Firefox, Thunderbird and KompoZer.

Two-Disc Special Edition

REVOLUTION OS



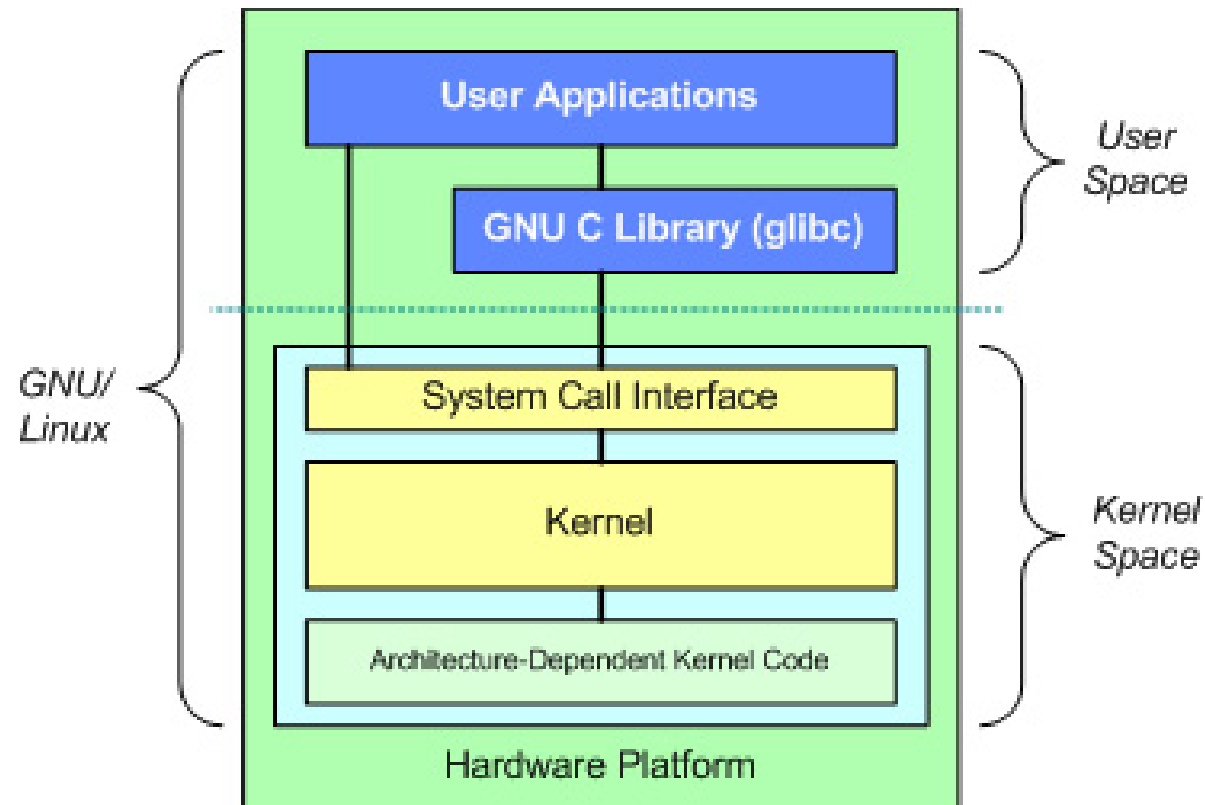
"A Great Film and an Important One!"

– Ron Wells, *Film Threat*

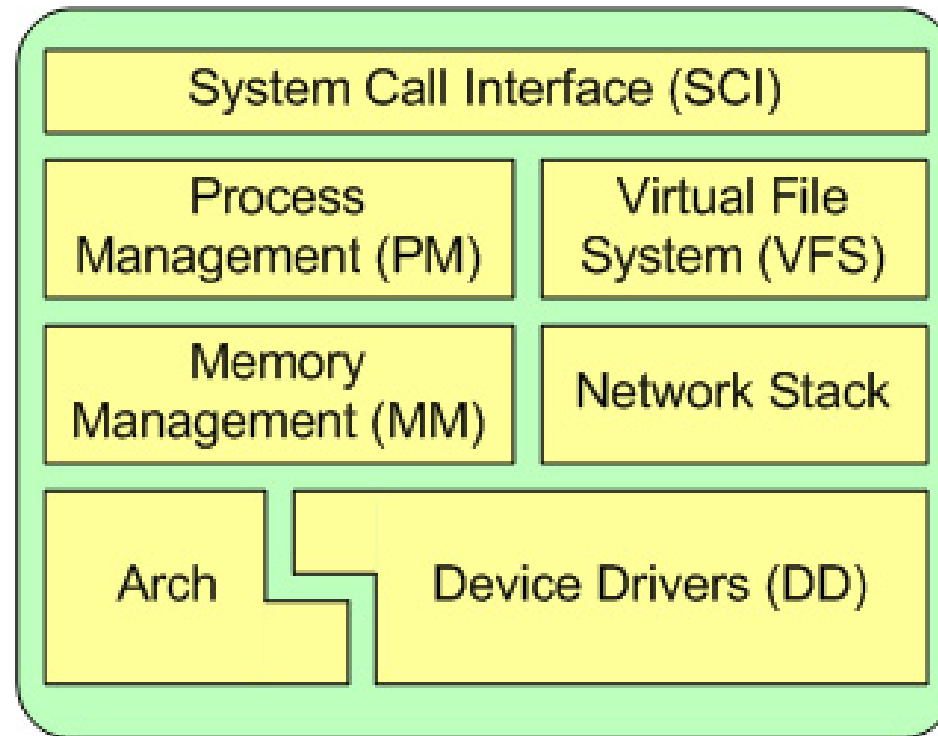
Hackers, Programmers & Rebels UNITE!

WONDERVIEW PRODUCTIONS presents a J.T.S. MOORE FILM
"REVOLUTION OS" Featuring: LINUS TORVALDS RICHARD STALLMAN
BRUCE PERENS ERIC RAYMOND LARRY AUGUSTIN BRIAN BEHLENDORF
MICHAEL TIEMANN Narrated by SUSAN EGAN Cinematography by J.T.S. MOORE
Music by CHRISTOPHER ANDERSON-BAZZOLI
Directed, Written, Produced and Edited by J.T.S. MOORE

Linux Architecture

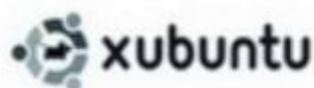
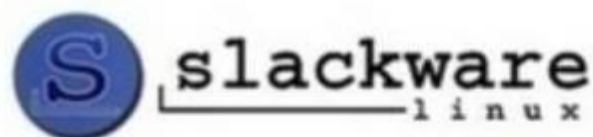


Linux Architecture

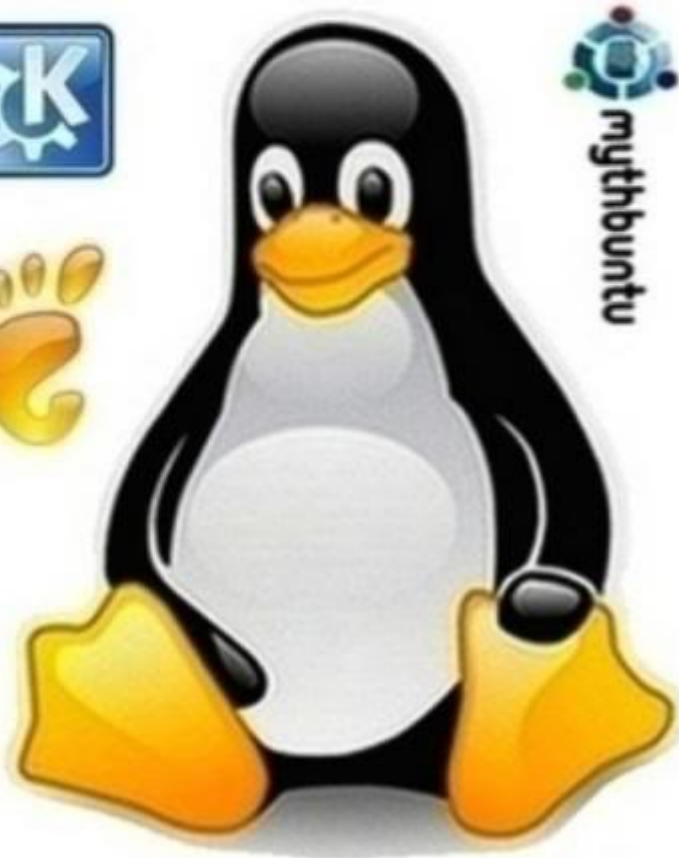


Linux Distro

A **Linux distribution** (often abbreviated as **distro**) is an operating system made from a **software collection**, which is based upon the Linux kernel and, often, a package management system.



debian



Complete Boot Process In Linux

- 1) POST (POWER ON SELF TEST)
- 2) Boot Loader – First & Second stage Boot Loader
- 3) CMOS comes into play
- 4) initramfs & Kernel loaded
- 5) Runlevels in Linux
- 6) Text-Mode Login
- 7) X Window System

Shell

Shell is **a user program** or it's environment provided for user interaction. Shell is an **command language interpreter** that executes commands read from the standard input device (keyboard) or from a file. **Shell is not part of system kernel**, but uses the system kernel to execute programs, create files etc.

Bash

Bash is a Unix shell and command language written by Brian Fox for the GNU Project as a free software replacement for the Bourne shell.