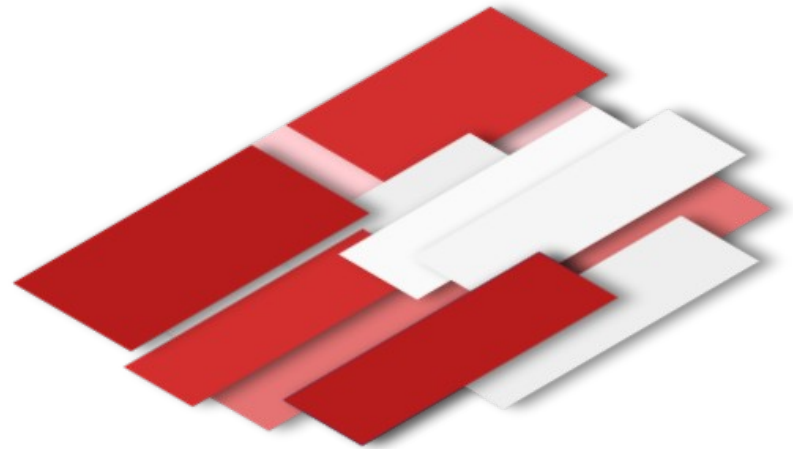


# Linux Diversity

Dive into Linux Subsystem  
for Personal Educational Purpose.

**Jakarta, Indonesia**  
2 February, 2020



# About Epsi



Yet, another underachiever.  
But hey, I have my own blog.

# About This Material

After watching this, you will understand:

- 1) A more systematic steps to learn GNU/linux.
- 2) How to make your own learning plan (syllabus).

This material is not really comprehensive.

I still have so much to learn.

# After first linux install?

# You might desire to

- Join linux community.
- Read documentation (statistically rare person).
- Update system.
- Install a bunch of application.
- Get busy with command line terminal.
- Surfing wiki and search engine.

## **And then what?**

# Where to go from here?

- Should I try other distro?
- What other distro should I try?
- So many distro, so little differences!
- Should I use VM or multiboot?

**Learn part of system!  
Instead just switching distro.**

# How Modular is Linux?





# How Modular is **Linux**?



## Package Manager

APT, ALPM, DNF, XBPS,  
Zypper, Portage



## Init

SysV, systemd, openRC,  
runit, S6.



## File System

ext4, XFS, Reiserfs,  
BTRFS, ZFS.



## Standard C Library

glibc or musl



## Desktop Environment

GTK+ based, QT based,  
enlightenment.



## Window Manager

Stacking, Tiling,  
Dynamic, Compositor.



# Modular Linux



You still need to Switch distro,  
by considering these three diversity



## Package Manager

You can learn using docker.



## File System

Require long time examination



## Init

You can learn using docker.

# When do I need a physical OS?

- You can learn Package Manager using Docker.
- You can also learn Init using Docker.
- But you cannot learn Filesystem using Docker.

**File system experience require long time examination.**

Thus you have to live with baremetal (physical) OS.

# Desktop Environment/ Window Manager

Most beginner start from switching DE/WM

[Desktop Customization]

Yet Another Presentation.

# Common Subsystem?

A few **must have** knowledge



## Wireless

[Wireless Command Line]



## Audio

[Audio Command Line]



## Boot Process: Grub2

[What to Do]

When the System Stuck, on Boot



## Dbus (for WM user only)

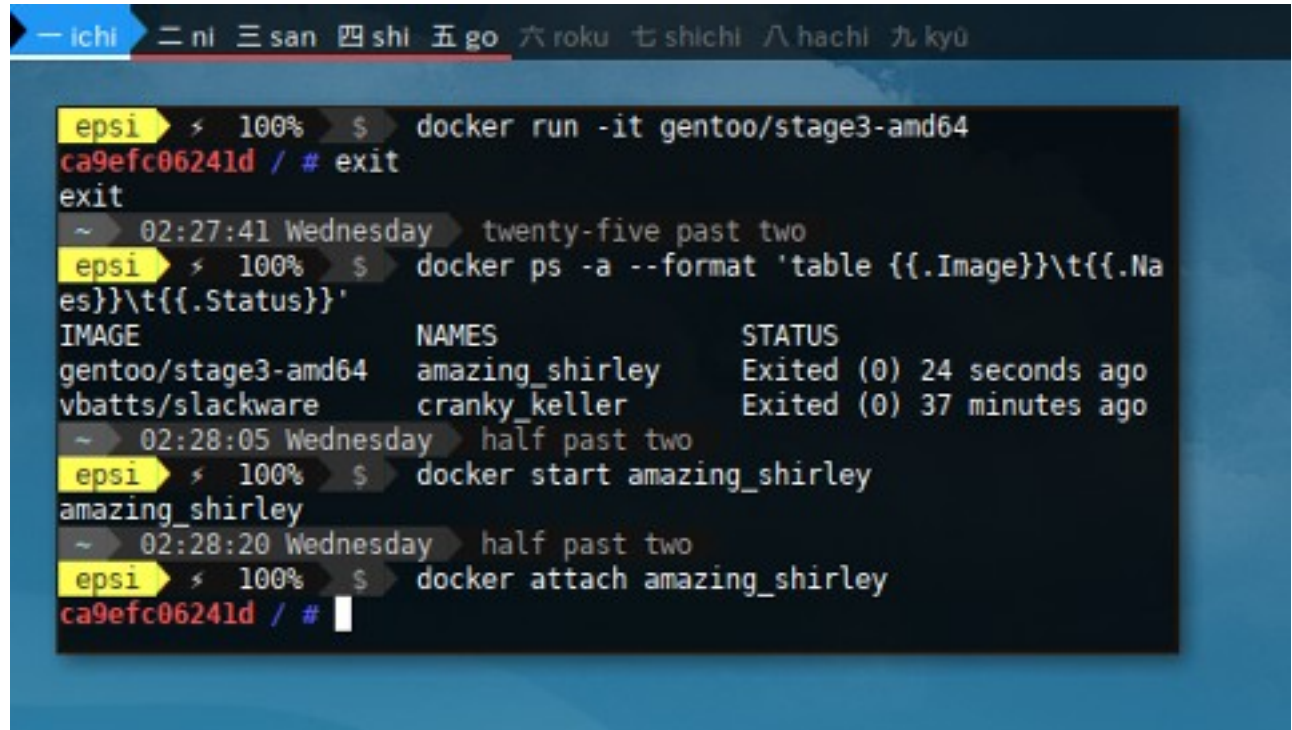
[dbus in Window Manager]

# Package Manager

# Docker Test Bed

## Package Manager with Docker

- APT
- ALPM
- DNF
- XBPS
- Zypper
- Portage



A terminal window with a blue background and a top bar showing Japanese characters. The terminal shows a user named 'epsi' running Docker commands. The first command is 'docker run -it gentoo/stage3-amd64', which results in a new container 'ca9efc06241d' being created and entered. The user then types 'exit' to leave the container. The second command is 'docker ps -a --format 'table {{.Image}}\t{{.Names}}\t{{.Status}}'', which displays a table of running and exited containers. The table shows two containers: 'gentoo/stage3-amd64' named 'amazing\_shirley' which has exited 24 seconds ago, and 'vbatts/slackware' named 'cranky\_keller' which has exited 37 minutes ago. The third command is 'docker start amazing\_shirley', which starts the 'amazing\_shirley' container. The fourth command is 'docker attach amazing\_shirley', which attaches the user to the 'amazing\_shirley' container, showing a prompt 'ca9efc06241d / # '.

```
epsi < 100% > $ docker run -it gentoo/stage3-amd64
ca9efc06241d / # exit
exit
~ 02:27:41 Wednesday twenty-five past two
epsi < 100% > $ docker ps -a --format 'table {{.Image}}\t{{.Names}}\t{{.Status}}'
IMAGE                                NAMES                STATUS
gentoo/stage3-amd64                 amazing_shirley      Exited (0) 24 seconds ago
vbatts/slackware                    cranky_keller        Exited (0) 37 minutes ago
~ 02:28:05 Wednesday half past two
epsi < 100% > $ docker start amazing_shirley
amazing_shirley
~ 02:28:20 Wednesday half past two
epsi < 100% > $ docker attach amazing_shirley
ca9efc06241d / #
```

Docker is suitable for  
old notebook with low resources.

# More Articles about Docker Test Bed

- [[Debian - APT](#)]
- [[openSUSE - Zypper](#)]
- [[Fedora - DNF](#)]
- [[Void - XBPS](#)]
- [[Slackware - Package](#)]
- [[Gentoo - Portage](#)]

# Package Manager Feature?

Deep knowledge require long time experience.  
Most of issues comes months after install.



# Be Aware of Package Manager Advantage/Issue

- [[APT Pinning](#)]
- [[Selective Emerge](#)]
- [[Unbundling AUR in ALPM](#)]
- [[Upgrading Fedora](#)]
- [[GhostBSD Ports](#)]

# Init?

# Who Use What!

## OpenRC

Gentoo, Artix,  
Devuan, GhostBSD.

## SysV

Slackware,  
Devuan.

## runit

Void,  
Artix.

## s6

Obarun,  
Artix.

## systemd

Most major distro.

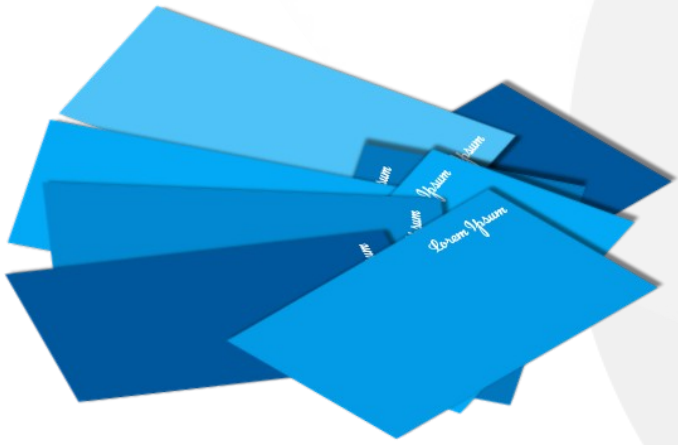
# Civil War

[The systemd Controversy]

Still debating in 2020 between:  
**systemd+gnome** versus **linux+diversity**.

# Example Usage

[Setup LAMP stack with Manjaro OpenRC]



# File System?

ext4, XFS, Reiserfs, BTRFS, ZFS.

Deep knowledge require long time experience.

Most of issues comes months after install.

You cannot just install, and just understand file system instantly.

# File System

## and how to find them



**ext4**

Most common in GNU/Linux.

---



**ZFS**

Common in BSD.

---



**UFS**

Common in BSD

---



**BTRFS**

Default in openSUSE /

---



**XFS**

Used to be Default in  
openSUSE /home

---

# Example Issue and Workaround:

- BTRFS snapshots:
  - [[File System - Trapped in Snapper Rollback](#)]
- BTRFS with GRUB:
  - [[File System - GRUB2 support for BTRFS](#)]
- UFS along with linux Multiboot:
  - [[GhostBSD - Multiboot](#)]
- NixOS in Multiboot:
  - Use chainloader in GRUB



# Standard C library in OS?

**glibc or musl.**

I must admit,  
I do not have any experience with musl.

Linux Diversity

# Switching Distro?

While you are young and still have time.  
Get yourself quarterly (three months) curriculum/plan.

Just get pass through it.  
No need to go deep with coding.  
Be an ordinary user.

After this one year,  
you are already mature enough with  
broader view  
to choose whatever linux you want.

If you want to get more wisdom.  
Learn BSD land in the second year.

# Example Syllabus (learning plan)

Make a target of first year with linux.

Ubuntu/  
Manjaro/ Mint

openSUSE

Arch

Gentoo

Quarter I

Quarter II

Quarter III

Quarter IV

- learn the DE universe: gnome-shell, plasma, xfce4
- learn basic command line.

- learn filesystem: btrfs, xfs
- also learn yast2

- know your system,
- dive into the world of cli/terminal shell

- learn init other than systemd
- learn patience

# Example Q1:

## Ubuntu/ Mint/ Manjaro

### Basic Terminal Command

- ls, cat, grep, ps, top, man, info, su, sudo
- always use \$ man for documentation before google.

### Also learn about basic linux briefly

- Examine Filesystem Hierarchy Standard (FHS)
- Examine boot process.
- Solving audio or wireless issue.

### Read The Fine Manual

- [[ubuntu-manual](#)] (GUI)
- [[debian-handbook](#)] (hertzog)

### More Terminal Command

- nmcli, ncdu, ntop, cfdisk
- lspci, lsusb, lsmod, dmesg, ip ,iw

# Example Q3:

## Arch: Leverage yourself to Arch

- Install with command line only
  - add driver manually, add username manually, add DE manually, use pacman
- Read the holy arch wiki
  - there is a lot of good material here
- Use packer, cower, or other AUR Helper
  - automatic compilation, try any unofficial application from AUR
- Dare to use minimalis WM, rather than eyecandy DE
  - openbox, awesome, i3, bspwm
- Penetration Testing Application
  - add and install repo: BlackArch or maybe ArchStrike

## Philosophy: Knowing Your System

# Install Log/ Post Install Log

- [[Fedora](#)]
- [[openSUSE](#)]
- [[Debian wheezy](#)] (old)
- [[GhostBSD](#)]
- [[Mageia](#)]
- [[Slackware](#)]



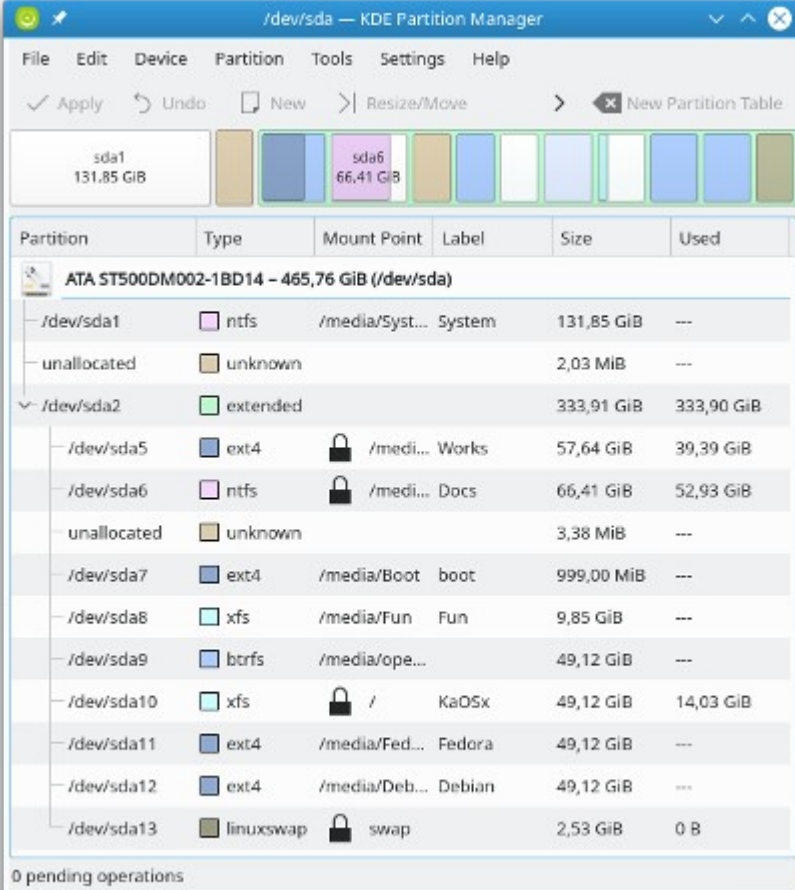
# Multiboot?

For linux enthusiast.



# Multiboot

## [Partition Schema]



ATA ST500DM002-1BD14 - 465,76 GiB (/dev/sda)

Partition	Type	Mount Point	Label	Size	Used
/dev/sda1	ntfs	/media/Syst...	System	131,85 GiB	---
unallocated	unknown			2,03 MiB	---
/dev/sda2	extended			333,91 GiB	333,90 GiB
/dev/sda5	ext4	/medi...	Works	57,64 GiB	39,39 GiB
/dev/sda6	ntfs	/medi...	Docs	66,41 GiB	52,93 GiB
unallocated	unknown			3,38 MiB	---
/dev/sda7	ext4	/media/Boot	boot	999,00 MiB	---
/dev/sda8	xfs	/media/Fun	Fun	9,85 GiB	---
/dev/sda9	btrfs	/media/ope...		49,12 GiB	---
/dev/sda10	xfs	/	KaOSx	49,12 GiB	14,03 GiB
/dev/sda11	ext4	/media/Fed...	Fedora	49,12 GiB	---
/dev/sda12	ext4	/media/Deb...	Debian	49,12 GiB	---
/dev/sda13	linuxswap	swap		2,53 GiB	0 B

0 pending operations

# Partition Schema

Old Example Using MBR



**Primary: Windows**

Usually with UEFI Partition.



**Extended: Linux**

- Swap
- Shared Partition
- First Distro
- Second Distro
- Third Distro



**Extended: BSD**

Not discussed here.

# fstab

- Learn to make shared partition.
- BTRFS subvolume is interesting.

[[Multiboot - /etc/fstab](#)]

# chroot

- Some OS is comfortably installed using chroot:
  - such as: Gentoo, LFS.
- Other OS can be updated using chroot:
  - beware of small issues.

[[Multiboot - chroot](#)]

# Tips

Keep your samba's network share persistence along multiboot.

[[Multiboot - Samba](#)]

# Tips

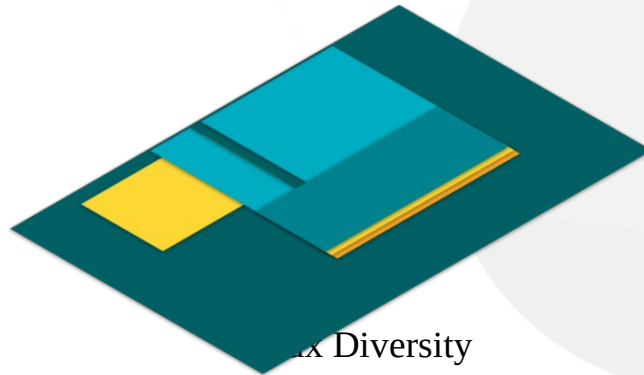
Linux Multiboot with BSD,  
can be done using UFS, instead of ZFS.

[[GhostBSD: Multiboot](#)]

# Kernel?

make menuconfig

# Interesting Diversity?



Feb 02, 2020

ax Diversity



# Interesting Diversity?



## Project Trident

Runit + ZOL + XBPS + MUSL.

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## LFS

No comment.

---



## Alpine Linux

Busybox (no GNU tools).

---



## NixOS

Exotic Package Manager.

---



## And many more

You name it!

---

# What is Next?

More Wisdom!  
**Learn BSD land!**

# Questions?

Don't be shy!



# The End

Thank You for Your Time.