

CSGE602055 Operating Systems

CSF2600505 Sistem Operasi

Minggu 09: File System & Persistent Storage

Rahmat M. Samik-Ibrahim

Universitas Indonesia

<http://rms46.vlsm.org/2/207.html>

REV096 8-NOV-2017

Minggu 00	29 Aug - 05 Sep 2017	Intro & Review
Minggu 01	07 Sep - 12 Sep 2017	IPR, SED, AWK, REGEX, & Scripting
Minggu 02	14 Sep - 19 Sep 2017	Protection, Security, Privacy, & C-language
Minggu 03	26 Sep - 30 Sep 2017	BIOS, Loader, Systemd, & I/O
Minggu 04	03 Okt - 07 Okt 2017	Addressing, Shared Lib, Pointer & I/O Programming
Minggu 05	10 Okt - 14 Okt 2017	Virtual Memory
Ming. UTS	15 Okt - 24 Okt 2017	
Minggu 06	26 Okt - 31 Okt 2017	Concurrency: Processes & Threads
Minggu 07	02 Nov - 07 Nov 2017	Synchronization
Minggu 08	09 Nov - 14 Nov 2017	Scheduling & Network Sockets Programming
Minggu 09	16 Nov - 21 Nov 2017	File System & Persistent Storage
Minggu 10	23 Nov - 28 Nov 2017	Special Topic: Retreat
Cadangan	30 Nov - 09 Des 2017	
Ming. UAS	10 Des - 23 Des 2017	

Agenda

- 1 Start
- 2 Agenda
- 3 Week 09
- 4 File Systems
- 5 Mass Storage Systems
- 6 FUSE
- 7 RAID
- 8 The End

Week 09: File System & Persistent Storage

- Reference: (OSCE2e ch9/10/11) (UCB 17A/18/19) (UDA P4L2 P4L2) (OLD 07 09) (SUP WEEK09)
- File System Interface
- File Attribute
- File Operation
- Disk Structure and Organization
- File System Types
- Directory
- FS Mounting vs. Volume Based System
- FS Structure and Implementation
- File Control Block
- FS In Memory Structure
- VFS
- Directory Implementation

- File System Layers
 - Application Programs
 - Logical File Systems
 - File-Organization Module
 - Basic File Systems
 - I/O Control
 - Hardware Device
- Allocation Method
 - Contiguous
 - Linked
 - Indexed
 - Combined Scheme
- Cache
- STREAMS

Mass Storage Systems

- Mass Storage Structure
 - Solid State Disk
 - Storage Array
 - SAN
 - NAS
 - Scheduling: FCFS, SSTF, SCAN, C-SCAN, C-LOOK.
 - Disk Management
- Linux I/O Scheduling Algorithm.
 - Deadline Scheduler
 - Completely Fair Queueing (CFQ)

- the `/dev/` directory
 - `/etc/fstab`: configuration of filesystems
 - `/etc/mtab` → `/proc/mounts`: mounted filesystems
 - `/proc/swaps`: swap filesystems
 - `df`: checking disk space and filesystems
 - Device Major and Minor Numbers
 - UUID - Universally Unique Identifier (128 bits)
 - GUID - Globally Unique Identifiers: `ls -al /dev/disk/by-uuid`
 - practically is NOT guaranteed unique
 - FUSE: Filesystem in Userspace

- RAID 0, 1, 5, 6, 10, 100
- Note (<http://www.commodore.ca/windows/raid5/raid5.htm>):
 - RAID was created to enhance data performance, reliability and availability.
 - Striping, parity checking and mirroring are three primary functions of RAID systems.
 - RAID performs its functions transparent to the operating system.
 - Systems are typically defined by ranks consisting of five disks each connected to one or two Disk Array Controllers.
 - Different RAID levels provide varying degrees of speed and data protection.
- Lab
 - Visit <http://os.vlsm.org/>

The End

- This is the end of the presentation.