# Operating System

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1. how ls cmd process executed?
2. what is process?
3. what is virtual memory?
4. what the difference between memory cache and virtual memory?
5. what is CPU protect mode?
6. difference between BIOS and UEFI under CPU protect mode?

# 3 pieces operating system

## Virtualization

- The Abstraction: The process
- Interlude: Process API
- Mechanism: Limited Direct Execution
- Scheduling: Introduction
- Scheduling: The multi-level feedback queue
- Scheduling: Introduction
- Mechanism: Limited Direct Execution
- Scheduling: Proportional Share
- Multiprocessor Scheduling
- CPU Virtualization
- Memory Virtualization
- The abstraction: Address Space
- Interlude: Memory API
- Mechanism: Address Translation
- Segmentaion
- Free-Space Management
- Paging: Introduction
- Paging: Faster Translation(TLBs)/Smaller tables
- Beyond Physical Memory: Mechanisms/Policies
- Complete Virtual Memory Systems
- Memory Virtualization Summary

## Concurrency

- Concurrency: An Introduction
- Interlude: Thread API
- Locks
- Lock-based concurrent data structure
- Condition Variables
- Semaphores
- Common Concurrency Problems
- Event-based concurrency(Advanced)
- Summary of Concurrency

## Persistence

- A Dialogue on Persistence
- I/O Devices
- Hard Disk Drives
- Redundant Arrays of Inexpensive Disks(RAIDs)
- Interlude: Files and Directories
- File System Implementation
- Locality and the fast file system
- Crash Consistency: FSCK and Journaling
- Log-structured file systems
- Flash-based SSDs
- Data Integrity and Protection
- Summary Dialogue on Persistence
- A Dialogue on Distribution
- Distributed Systems
- Sun’s Network File System(NFS)
- The Andrew File System(AFS)
- Summary Dialogue on Distribution

# CPU Virtualization

## Process

process control

process tools

process state

process create

### API

#### System Call

exec()

wait()

fork()

## Mechanism

### Problem

swtiching between process

restricted operations

### technique

limited direct execution

## Scheduling

### Multiprocessor

Architecture

Synchronization

Cache Affinity

Single-Queue Scheduling

Multi-Queue Scheduling

Linux Multi-Processor Scheduling

### Proportional Share

Linux Completely Fair Scheduler

#### Tickets

mechaism

implementation

Example

how to assgin tickets

why not determinstic

### Multi-Level Feedback Queue

basic rules

Tuning MLFQ issue

#### Attempt

how to change priority

the priority boost

better accounting

### introduction

workload

Metrics, repsonse time

Incorporating I/O

FIFO

Shorted Job First

Shortest Time-to-Completion First

Round Robin

Nor more Oracle