Lecture 10

block devices - LVM & Flash
File Systems

Notes by:
Chander Shindusani

Logical volume mgmt
- RAID/mirror/striped
- concatenate/split
- snapshot
- migration

host

storage

N-1

Concatenation

SNAPSHOT

logical addr. space

host

disk 1

disk 2

snapshot (read only)
Migration
- Moving data from one system disk to another without stopping the system

old device

After write on 1st block

new device

old device

new device
Flash: (Nano Flash)
- Organized into pages and blocks
  - 32-128 pages
  - 2-4KB

Writing a page in Flash:
Read the entire page

Erase the flash
Write the entire page

Logical

Physical
MLC
Multilevel cell

SLC
Single level cell

\[
\begin{array}{c|c}
0 & 1 \\
\end{array}
\]
only 2 separate voltages

Performance Numbers

Flash
Read: 20-50\textmu s
write: 100-300\textmu s
erase: 1-2\text{ms}

\((2k - 4k)\)
\((\sim 1/4 - 1/2 \text{MB})\)

FILE SYSTEMS.
- has a namespace, set of objects, and set of actions

namespace: hierarchical,
\text{/usr - local - bin - command}

\text{"C:" - Windows - System 3.2}

text names

objects: sequence of bytes: file
directories
special files

actions: open/close
read/write
create/delete
rename
seek/truncate