

File Systems II

CS 241

Dec. 2, 2013

#1(e)

- **Example file system:**
 - Each i-node contains 10 direct, 1 SI, 1 DI, 1 TI
 - Each disk block is 4 KB is size
 - Each disk pointer is 8 B long
- Detail how a 10 MB file would be stored?

#1(f)

- What is the maximum addressable size of the file system?

#1(g)

- How much space does a 1 byte file take up?

File System

Directory: /home/

File System

File: /home/waf/hello.txt

File System

System call: `stat()` : get file status

```
int stat(const char *path, struct stat *buf);
```

```
struct stat {
    dev_t      st_dev;      /* ID of device containing file */
    ino_t      st_ino;      /* inode number */
    mode_t     st_mode;     /* protection */
    nlink_t    st_nlink;    /* number of hard links */
    uid_t      st_uid;     /* user ID of owner */
    gid_t      st_gid;     /* group ID of owner */
    dev_t      st_rdev;     /* device ID (if special file) */
    off_t      st_size;     /* total size, in bytes */
    blksize_t  st_blksize;  /* blocksize for file system I/O */
    blkcnt_t   st_blocks;   /* number of 512B blocks alloc'd */
    time_t     st_atime;    /* time of last access */
    time_t     st_mtime;    /* time of last modification */
    time_t     st_ctime;    /* time of last status change */
};
```

`stat()`

vs.

`open()`

File Permissions

File Permission:

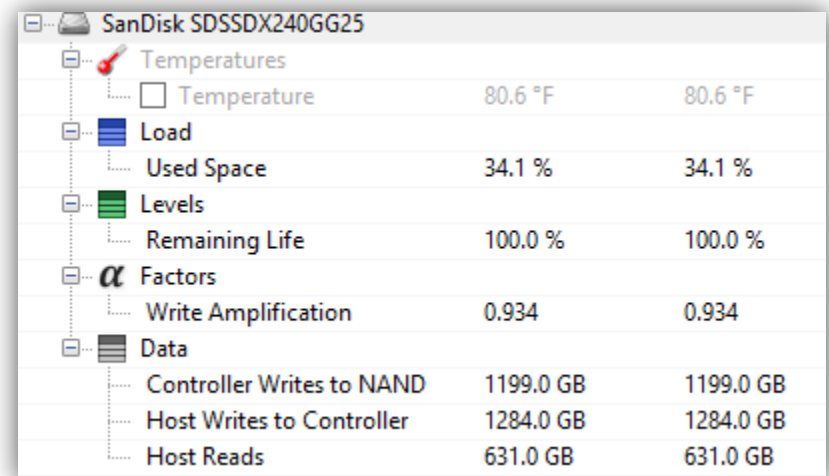
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Disks

Types of Disks:

Hard Disk Drive Considerations

Solid State Drive Considerations



The screenshot displays a software interface for monitoring a SanDisk SDSSDX240GG25 SSD. The interface is organized into several expandable categories, each with a corresponding icon. The 'Temperatures' category shows a single 'Temperature' metric at 80.6 °F. The 'Load' category shows 'Used Space' at 34.1%. The 'Levels' category shows 'Remaining Life' at 100.0%. The 'Factors' category shows 'Write Amplification' at 0.934. The 'Data' category shows three metrics: 'Controller Writes to NAND' at 1199.0 GB, 'Host Writes to Controller' at 1284.0 GB, and 'Host Reads' at 631.0 GB. Each metric is presented in a table-like format with two columns of values.

SanDisk SDSSDX240GG25			
Temperatures			
Temperature	80.6 °F		80.6 °F
Load			
Used Space	34.1 %		34.1 %
Levels			
Remaining Life	100.0 %		100.0 %
Factors			
Write Amplification	0.934		0.934
Data			
Controller Writes to NAND	1199.0 GB		1199.0 GB
Host Writes to Controller	1284.0 GB		1284.0 GB
Host Reads	631.0 GB		631.0 GB

Other File Systems