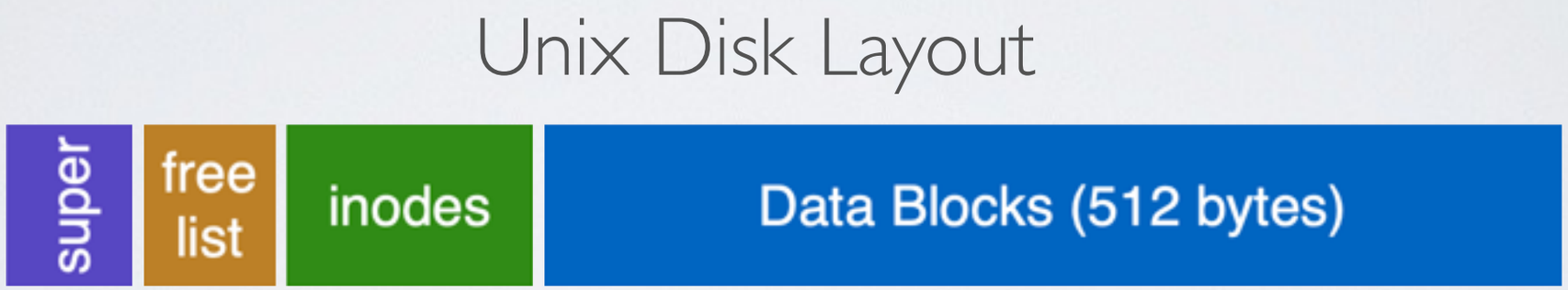
Original Unix FS



- It is slow on hard disk drive - only gets 2% of disk maximum (20Kb/sec) even for sequential disk transfers

Why so slow on hard disk drive?

Problem 1: in the original Unix File System, blocks were too small (512 bytes)

- File index too large
- Require more indirect blocks
- Transfer rate low (get one block at time)

Problem 2: unorganized freelist

- Consecutive file blocks not close together - pay seek cost for even sequential access
- Aging - becomes fragmented over time

Problem 3: poor locality

- inodes far from data blocks
- inodes for directory not close together - poor enumeration performance
  e.g., "ls", "grep foo *.c"