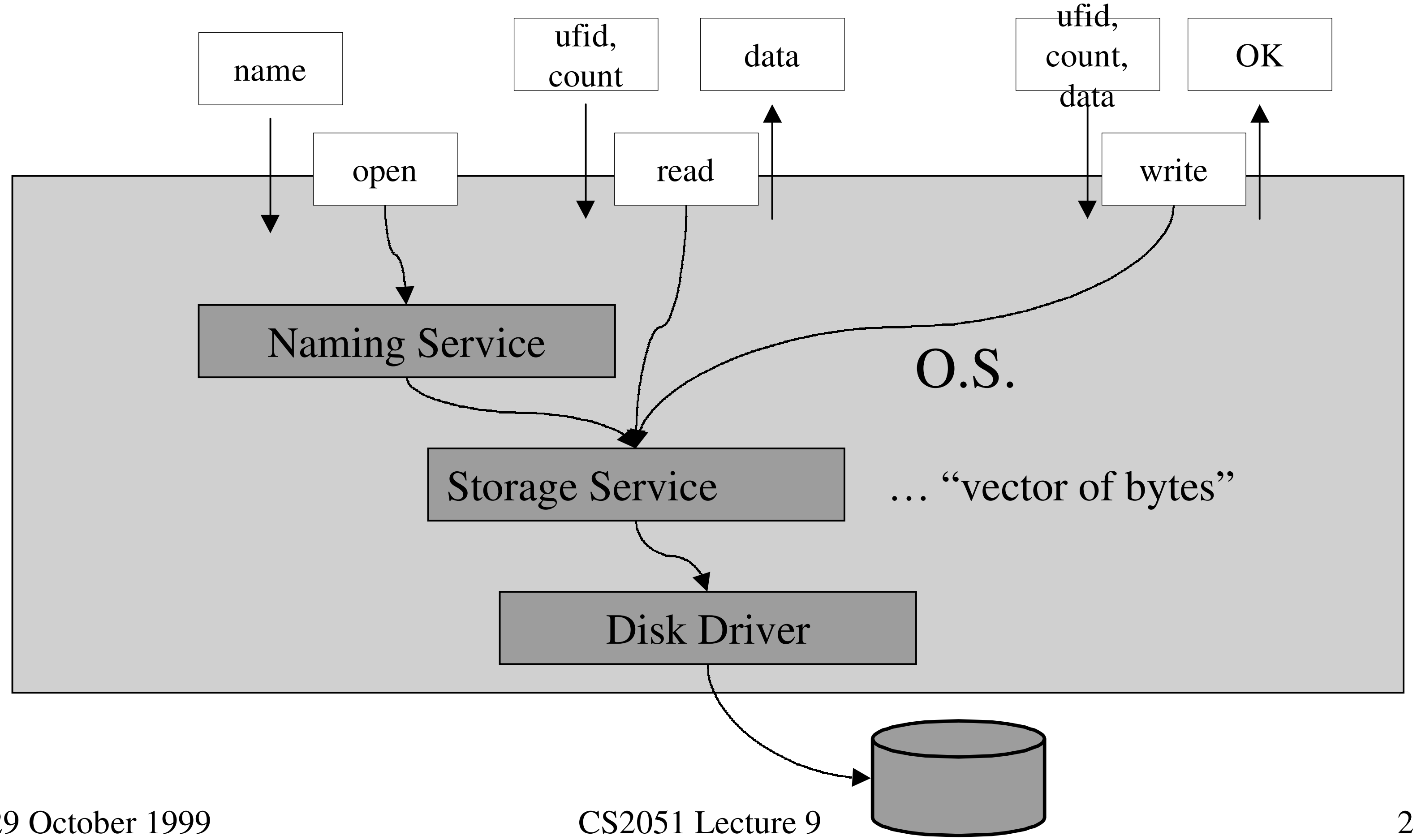
The File Manager

- Provides:
  - storage service (storage for arbitrary length files)
  - naming service (directories?)
  - protection
  - backup
  - concurrency control
  - existence control

Directory Service is Layered



Concurrency control

- How should multiple accesses be coordinated?
  - e.g. allow *either*
    - one writer, *or*
    - many readers
- Considered inflexible (e.g. database?)
  - applications define specific protocols

File System Implementation

- Metadata:
  – one entry per file in data storage area
  – indexed by system file identifier (SFID)

Metadata holds

– Type of entry:
– owner
– size
– location on disk
– date/time of creation/modification/access
– number of links

NB: quotas on …

File Storage Addressing

- Chaining within file
  - pro/con?
- Map in main memory
  - pro/con?
- Disk-based pointers
  - pro/con?
- Extent list
  - pro/con?

Free Space management

- Freespace file
  - How? Why? Pro? Con?
- Bitmap

- None

Efficiency and Speed

- Cylinder Clusters
  - small groups of:
    - metadata
    - directories
    - data storage
    - bitmaps?
- Put metadata in directories? (or v.versa)