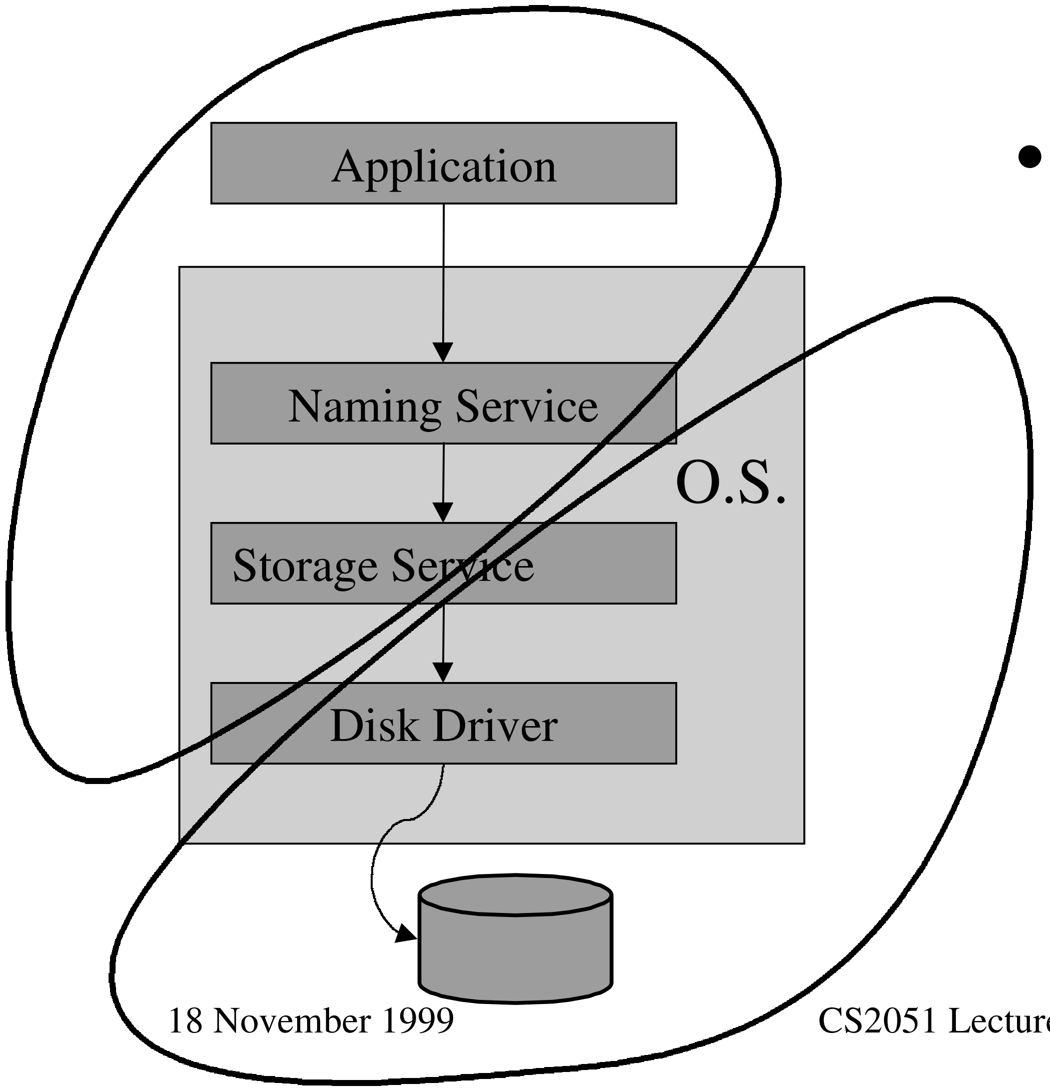
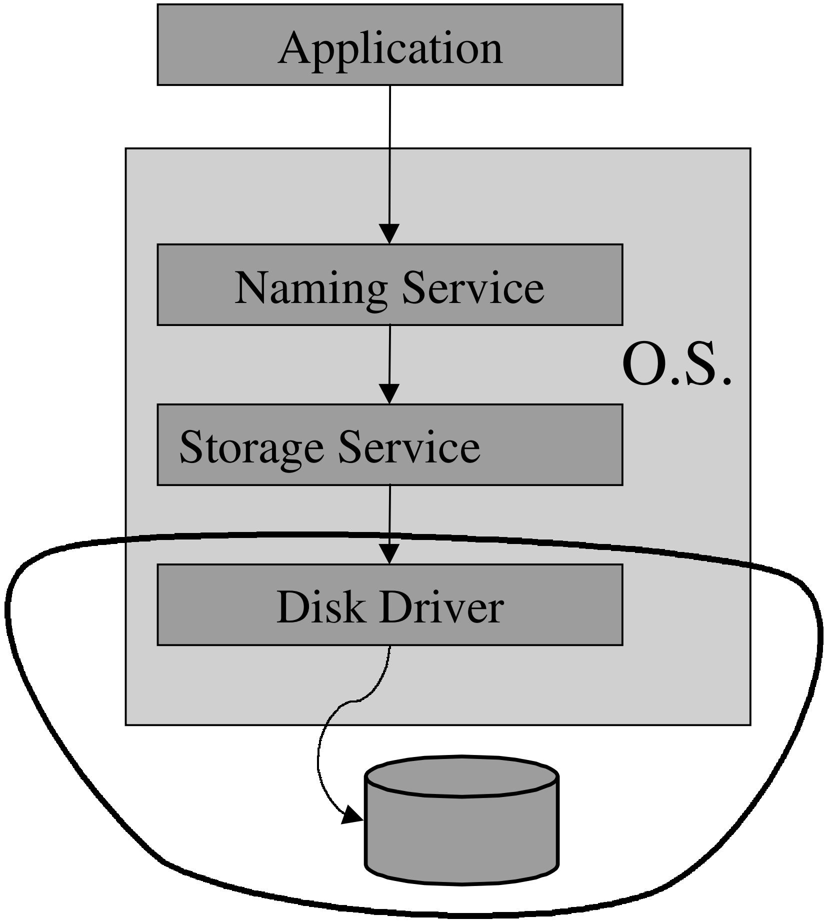
Unifying Networks, File Systems, and Virtual Memory

Network Based File Servers



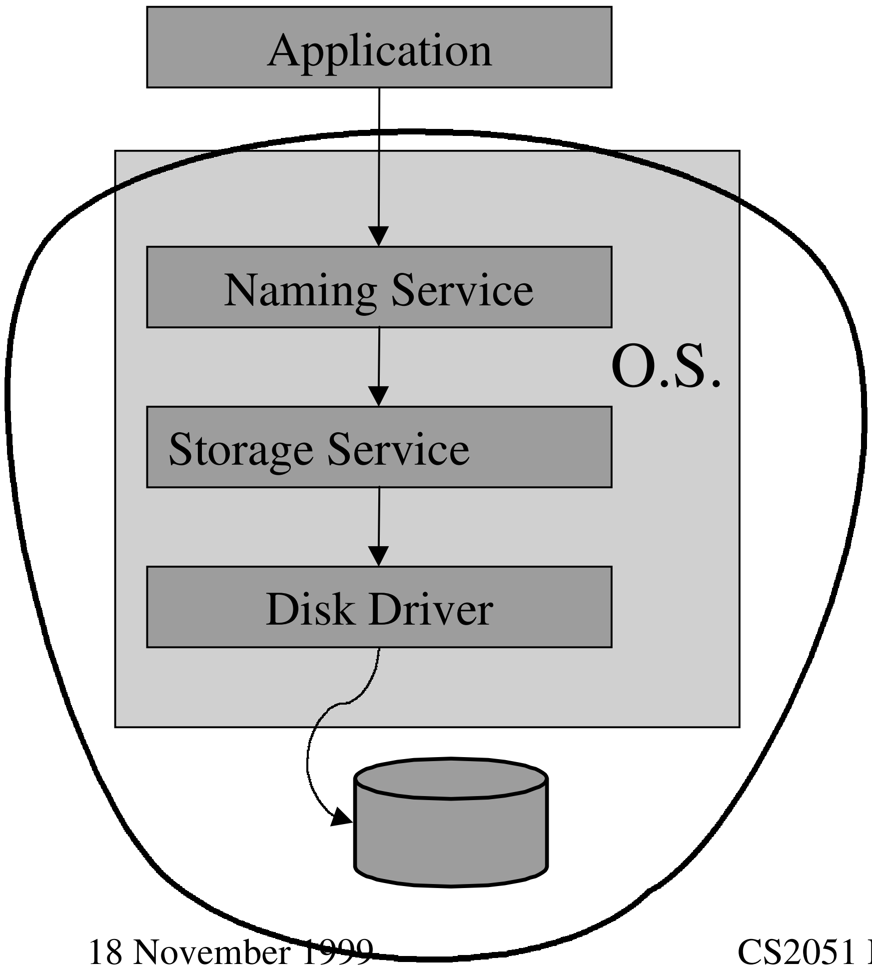
- Problem:
  - split functionality between *client* and *server*

Solution 1: Network Disk



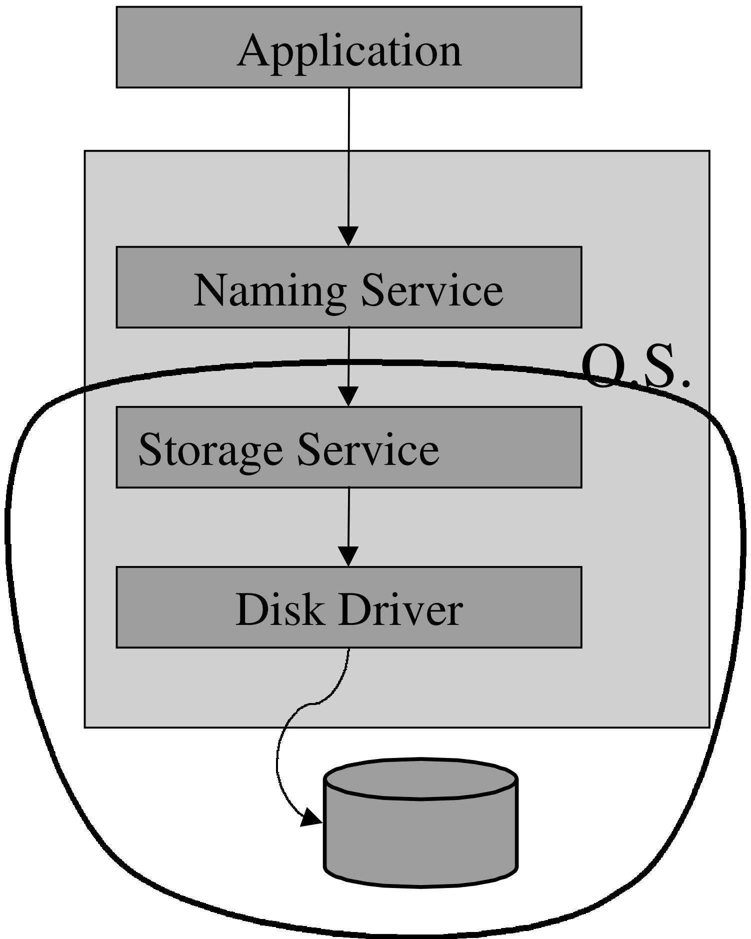
- Server provides just physical storage
- Problems:
  - coordinating multiple client systems?
  - freespace management?

Solution 2: File System Export



- All names resolved on server
- "name" means same file to every client
- Not ideal if clients are different (linux/ winNT/Sun/etc.)

Solution 3: Sun NFS



- Each “name” component of filename is translated on client
- Storage service implemented on server

Issues in Network File Systems

- Administration
- Protection:
  - Trust, Validation
  - different administration domains
- State
  - Client "knows about" server
  - Server "knows about" client?
  - Server crash? Multiple servers?

Virtual Memory and Storage

- VM:
  - copies parts of memory image to disk
  - copies areas from disk to memory

- File Manager:
  - copies from memory to disk
  - copies areas from disk to memory

???

Unified VM and File Manager

File Operation	Equivalent VM Operation
open	map file into Virtual Address Space
read	access virtual address: page fault causes disk read
write	access virtual address: (eventual) page rejection causes disk write [n.b. zero fill on write to unallocated page?]
close	unmap page

- Ideal for sharing:
  - useful for programs and libraries
- Problems: