CSCE 351
Operating System Kernels

MINIX System Task

Steve Goddard
goddard@cse.unl.edu

http://www.cse.unl.edu/~goddard/Courses/CSCE351

System Task Purpose

- Perform kernel services for the File System (FS) and Memory Manager (MM)
- Communicates with FS and MM via the standard message passing IPC
- Implemented in Layer 2 (recall Fig 2-16) as a device driver task (line 14837 is start of `sys_task`)
  - » Does not control an I/O device
  - » Implements an interface to the internal system
  - » Same privileges as I/O tasks and compiled in Kernel
  - » Notice that it always sends a reply to the sender, even if the message request is invalid

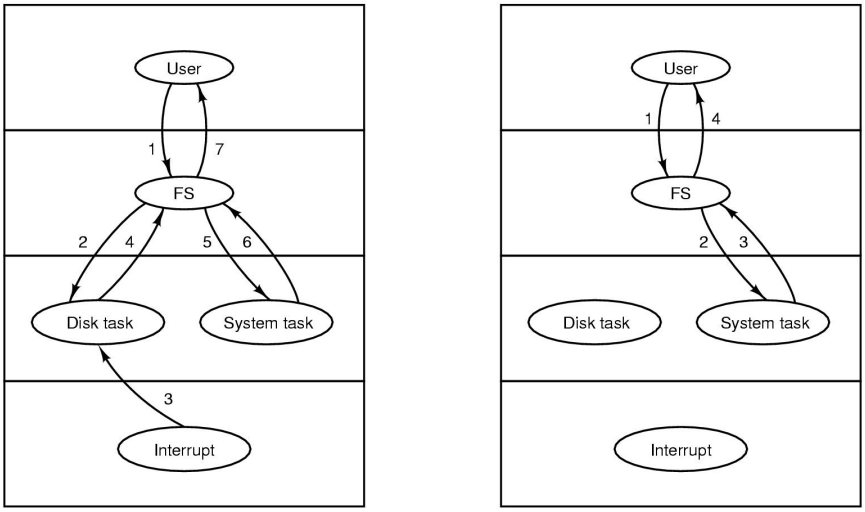
System Task Functions

- Figure 3-50, page 297, lists 19 types of messages that the System Task receives and processes
- We will only talk about two (three) of these:
  - » SYS_COPY (and SYS_VCOPY)
    - ❖ Most heavily used message.
    - ❖ Copies data to/from user processes for FS and MM
  - » SYS_TRACE
    - ❖ Sent by MM
    - ❖ Supports PTRACE system call, which is used for debugging

SYS_COPY

- Used to move data from FS or MM space to user space
- Required since FS and MM cannot directly access user process space
- SYS_COPY implemented with `do_copy`, which simply calls `phys_copy`
- SYS_VCOPY accepts multiple SYS_COPY requests as a single message to reduce overhead

File Read Example



SYS_TRACE

- Supports PTRACE system call, which supports process debugging
- Implemented with do_trace (line 15467) to perform the following operations:
  - » T_STOP, T_RESUME
  - » T_STEP, T_SETINS, T_SETUSER
  - » T_GETINS, T_GETUSER
  - » T_GETDATA, T_SETDATA