Sockets and Parallel Programming

CS439: Principles of Computer Systems

Bringing It All Together

- We've been studying how an OS manages a single CPU system
- As part of that, it will communicate with I/O devices
- One of the most important I/O devices is the disk, which provides stable storage
- But sending information to and retrieving information from I/O devices is slow
  - Spinning disks are particularly slow, so the OS tries to hide latency
    - Disk head scheduling algorithm
    - Partitioning
  - SSDs are faster, but still slow
    - And have durability issues!
- The network is one of those I/O devices
  - Networks are controlled by complex software that enables the proper routing of data and the appearance of reliability
  - As a programmer, we access the network through an abstraction called a socket

Concept Map Possible Terms

connected descriptor
server
parallel programming
socket
socket address
SOCK_STREAM
recv()
implicit communication
port
implicit synchronization

PCB
bind(2)
explicit synchronization
listening descriptor
shared memory
getaddrinfo()
getnameinfo()
connection
explicit communication
message passing

send()
accept(2)
well-known port
close(2)
listen(2)
ephemeral port
client
MPI
SOCK_DGRAM

Networks in Society

- Net Neutrality
  - Good thing: 3, 19
  - Bad thing: 6, 18
- ISPs and data commercialization
  - ISPs should get to do it: 1, 13
  - Should not get to do it: 4, 10
- Google incognito mode (pre-lawsuit)
  - Google is right: 5, 11
  - No way: 2, 14
- ISPs and data disclosure (RIAA, Altice)
  - ISPs should disclose: 7, 17
  - No way: 8, 20
- Personalized pricing
  - Should be legal: 9, 15
  - Should not be legal: 12, 16