Computer Networks

The Socket API

(§1.3.4, 6.1.2-6.1.4)

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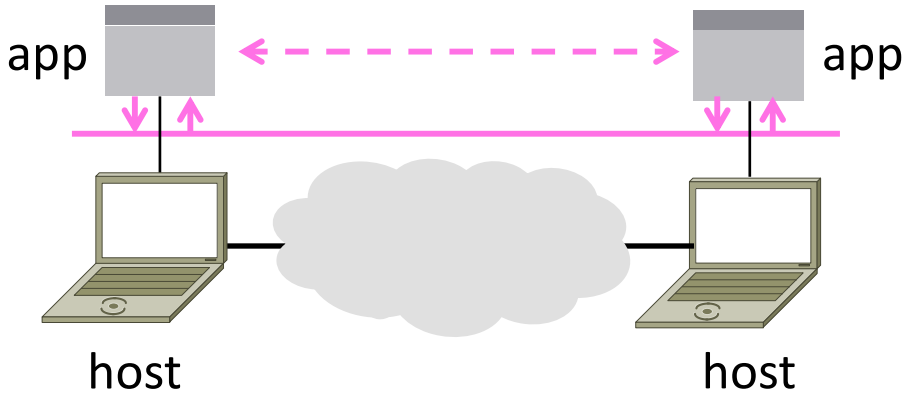
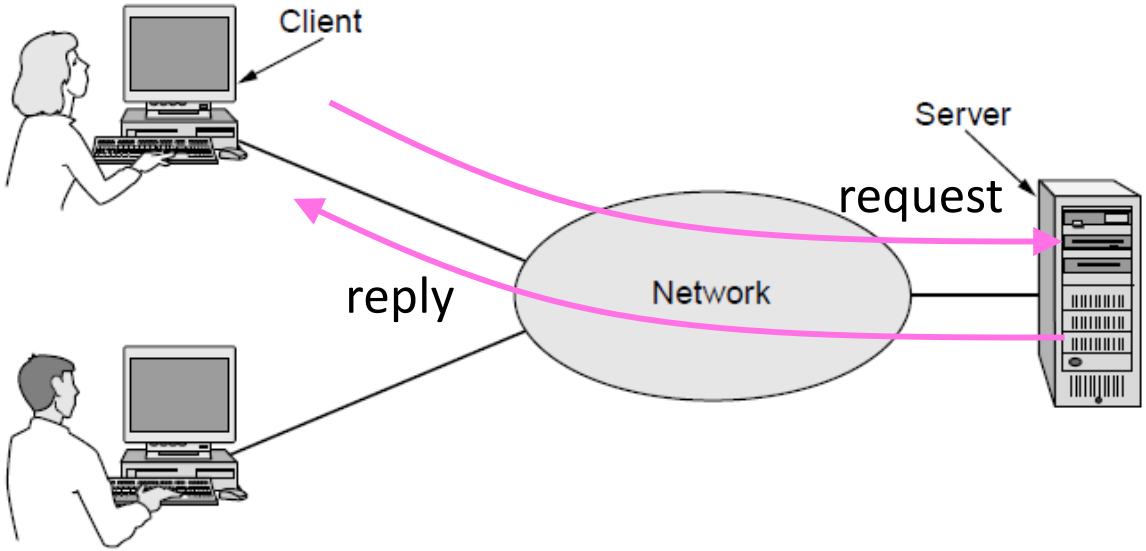
Network-Application Interface

- Defines how apps use the network
  - Lets apps talk to each other via hosts; hides the details of the network



Motivating Application

- Simple client-server setup



Motivating Application (2)

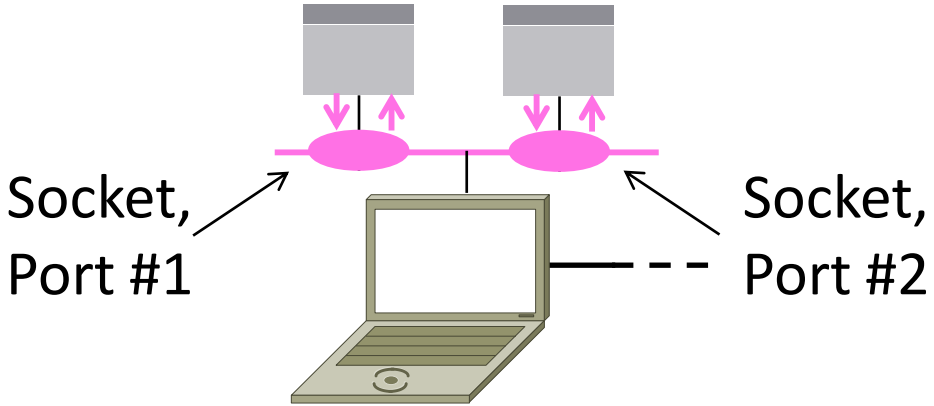
- Simple client-server setup
  - Client app sends a request to server app
  - Server app returns a (longer) reply
- This is the basis for many apps!
  - File transfer: send name, get file (§6.1.4)
  - Web browsing: send URL, get page
  - Echo: send message, get it back
- Let's see how to write this app …

Socket API

- Simple abstraction to use the network
  - The network service API used to write all Internet applications
  - Part of all major OSes and languages; originally Berkeley (Unix) ~1983
- Supports two kinds of network services
  - Streams: reliably send a stream of bytes »
  - Datagrams: unreliably send separate messages. (Ignore for now.)

Socket API (2)

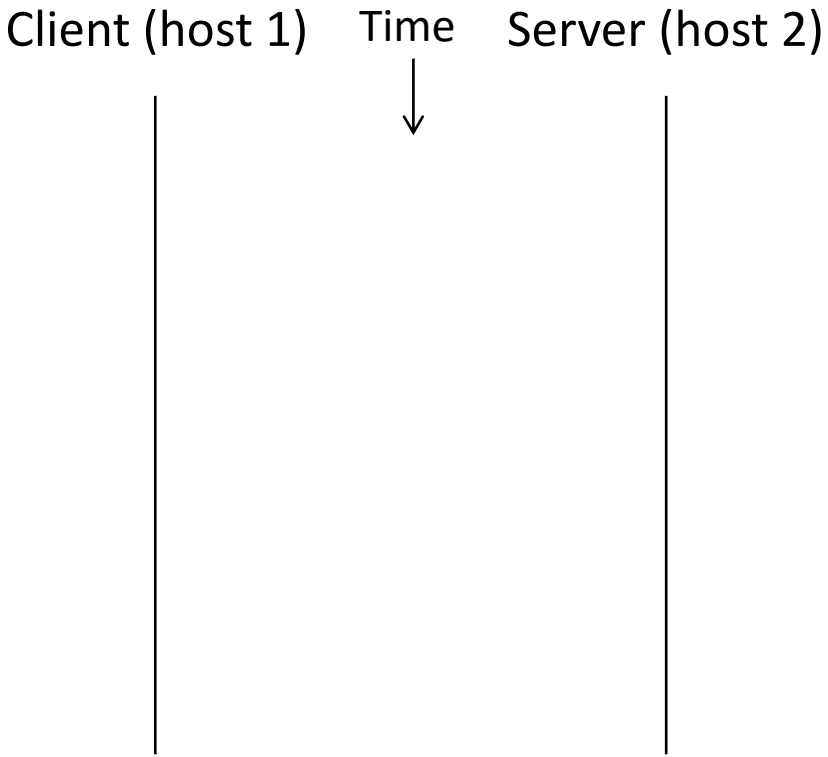
- Sockets let apps attach to the local network at different ports



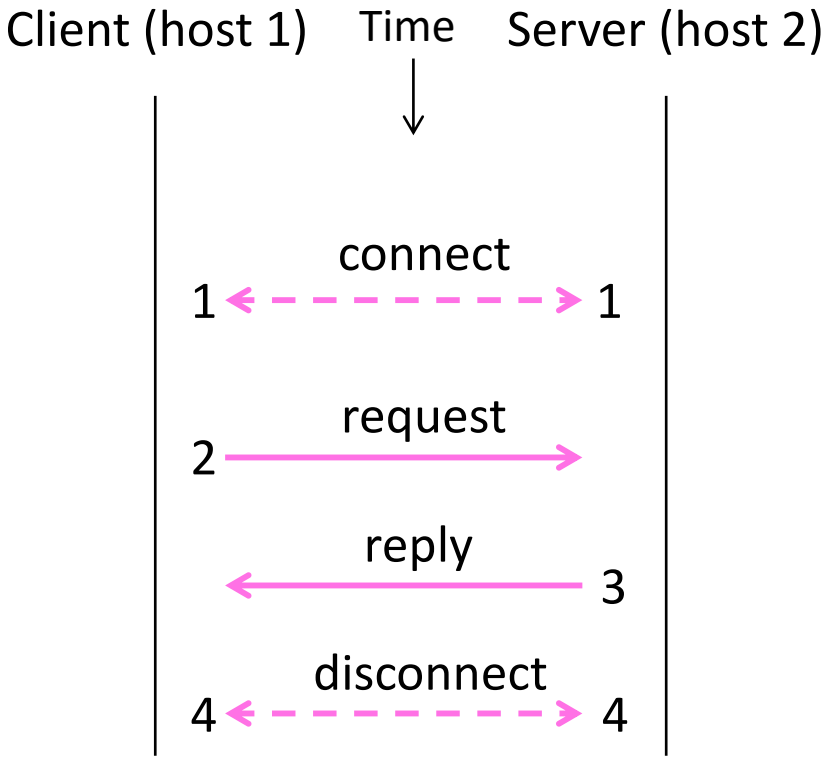
Socket API (3)

Primitive	Meaning
SOCKET	Create a new communication endpoint
BIND	Associate a local address with a socket
LISTEN	Announce willingness to accept connections; give queue size
ACCEPT	Passively establish an incoming connection
CONNECT	Actively attempt to establish a connection
SEND	Send some data over the connection
RECEIVE	Receive some data from the connection
CLOSE	Release the connection

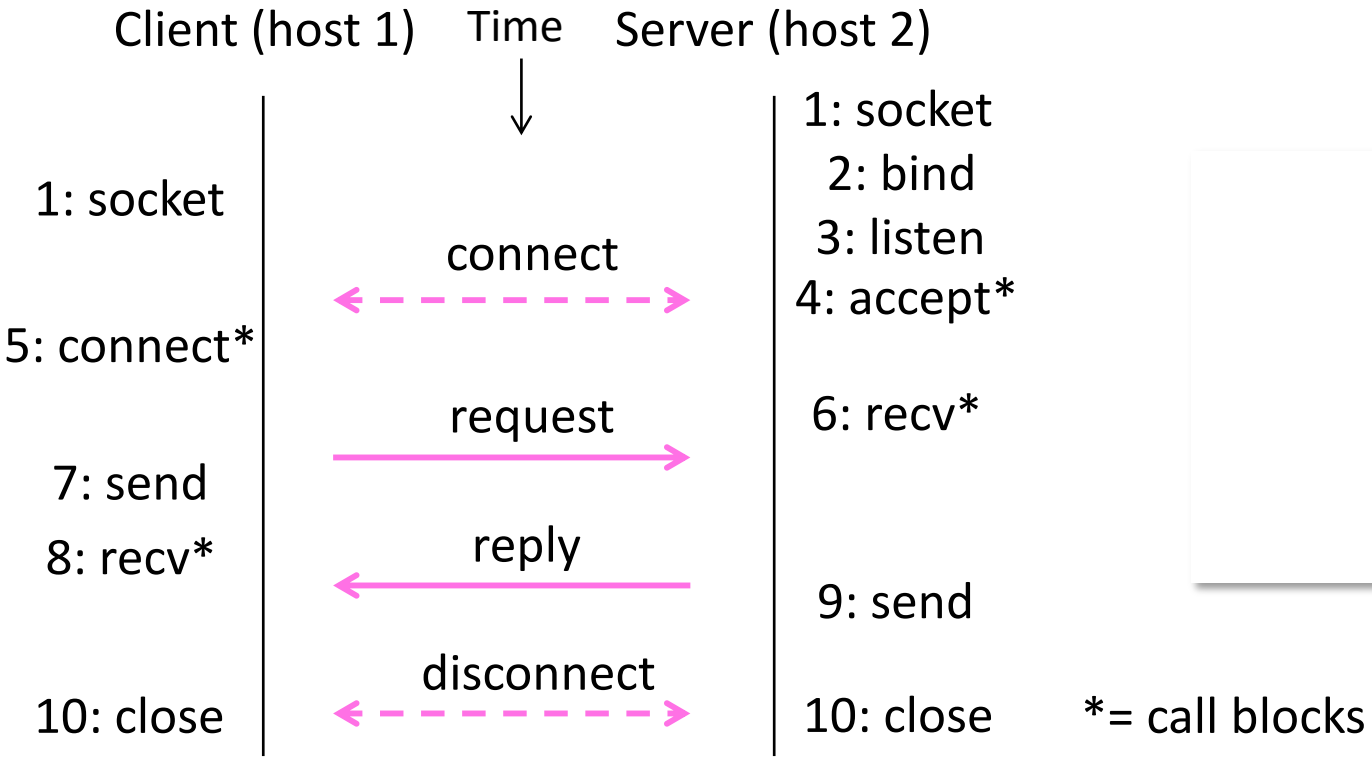
Using Sockets



Using Sockets (2)



Using Sockets (3)



Client Program (outline)

```
socket()        // make socket
getaddrinfo()   // server and port name
                // www.example.com:80
connect()       // connect to server [block]
…
send()          // send request
recv()          // await reply [block]
…               // do something with data!
close()         // done, disconnect
```

Server Program (outline)

```
socket()        // make socket
getaddrinfo()   // for port on this host
bind()          // associate port with socket
listen()        // prepare to accept connections
accept()        // wait for a connection [block]
…
recv()          // wait for request
…
send()          // send the reply
close()         // eventually disconnect
```

END