CSE 461

Section 1: UDP, TCP, and addresses

Addressing

- Project o requires sending your own IP address to another client

- Problem: getting own IP address can be hard

- How can we do it?

Getting own IP address: hostname method

Steps

- Get the computer's host name
- Resolve it into an IP address

Python example

import socket

name = socket.gethostname()

ip = socket.gethostbyname(name)

- Sometimes doesn't work depending on hostname configuration and/or will just return local host (127.0.0.1)

Getting own IP address: connect to server method

Steps

- Create a socket

- Connect to known server on internet

- Get socket address

Python example

import socket

s = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)

s.connect(('gmail.com',80))

ip = s.getsockname()[0]

- Useful when previous method doesn't work
- Similar methods exist for other languages as well

Other Methods

- getaddrinfo()
  - E.g., socket.getaddrinfo(name, 0)
  - Can return other network interfaces that you don't want (e.g., IPv6)
- Querying outside URL
  - E.g., urllib2.urlopen('http://abstract.cs.washington.edu/~zahorjan/ip.cgi').read()
  - Best method (if you have a dedicated server to tell you your IP)

Ports

- Addresses specific to applications/services on a system
- 16-bit numbers (from 0 to 165535)
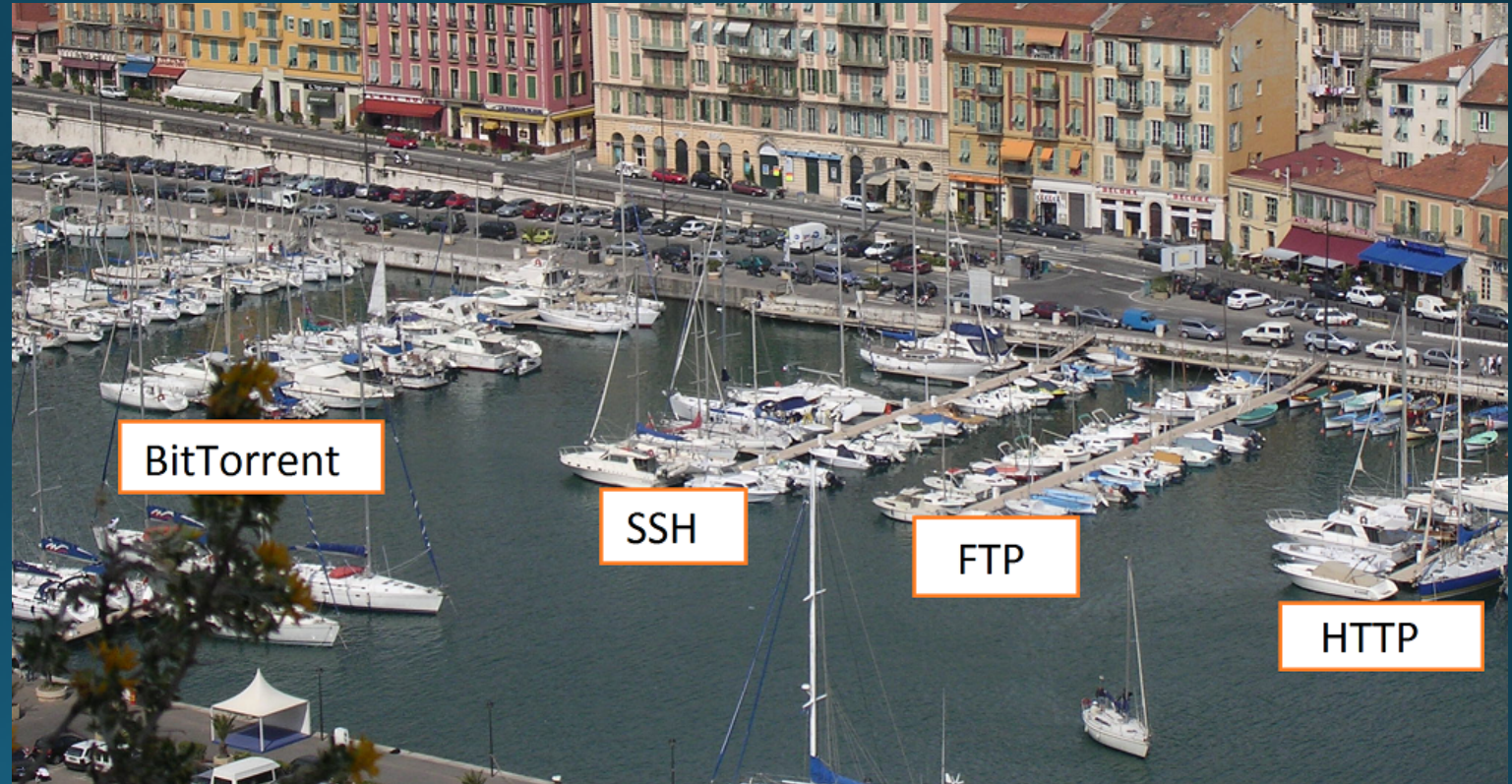
Well-Known Ports

- Many applications/services have designated ports
- Examples:
  - ftp: 21
  - ssh: 22
  - telnet: 23
  - http: 80
- Ports from 0 to 1023 are "well-known ports" (don't use them for protocols you make up!)
- Can see a list of your system's well known ports in /etc/services (Linux/Unix)

Hostnames map to IP addresses

- Hosts contact DNS (Domain Name System) servers to get IP address of a given name
- E.g., 'www.gmail.com' maps to 173.194.33.118
- nslookup demo

TCP vs UDP

- Sockets can implement either protocol
- "Transmission Control Protocol" will guarantee delivery
- "User Datagram Protocol" just sends the requested data (no guarantees)

Python example

UDP Socket

s = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)

TCP Socket

s = socket.socket(socket.AF_INET, socket.SOCK_STREAM)