Networking

- Addresses and DNS
- Ports
- TCP
- UDP

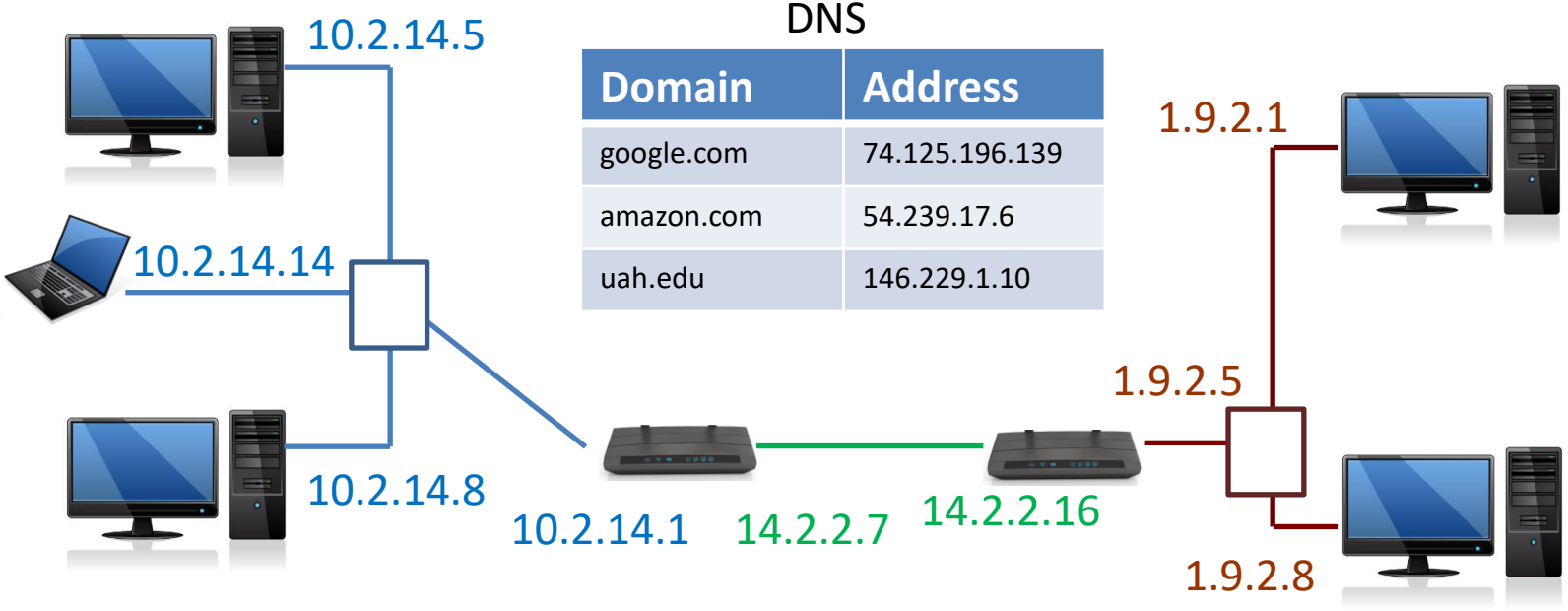
Advanced Python Programming

See Also

https://www.tutorialspoint.com/python/python_networking.htm

https://docs.python.org/2/howto/sockets.html

Ethernet



DNS

Domain	Address
google.com	74.125.196.139
amazon.com	54.239.17.6
uah.edu	146.229.1.10

- Each machine has a unique address
- Routers have multiple connections to bridge networks
- DNS maintains a map between name and number

Ports

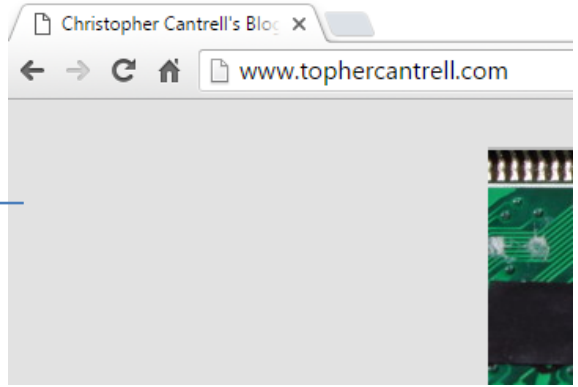
10.2.14.5

Web Server — 80

FTP — 21

Blaster Man — 15583

10.2.14.2



75.75.8.43

Well-Known and Registered Ports

- 0 – 1023: Well known ports
- 1024 – 49151: Assigned by IANA
- 49152 – 65535: Dynamic, Private, or Ephemeral

11111111	11111111

$2^{16} = 65{,}536$

Port	TCP	UDP	
0	N/A	N/A	In programming APIs (not in communication betwee
0		UDP	Reserved
1	TCP	UDP	TCP Port Service Multiplexer (TCPMUX)
2	TCP	UDP	CompressNET[5] Management Utility[6]
3	TCP	UDP	CompressNET[5] Compression Process[7]
4	TCP	UDP	Unassigned
5	TCP	UDP	Remote job entry
6	TCP	UDP	Unassigned
7	TCP	UDP	Echo Protocol
8	TCP	UDP	Unassigned
9	TCP	UDP	Discard Protocol
9		UDP	Wake-on-LAN
10	TCP	UDP	Unassigned
11	TCP	UDP	Active Users (systat service)[8][9]
12	TCP	UDP	Unassigned

79	TCP	UDP	Finger protocol
80	TCP SCTP	UDP	Hypertext Transfer Protocol (HTTP)[13]
80		UDP	QUIC (from Chromium) for HTTP
81	TCP		Torpark onion routing
82		UDP	Torpark control
88	TCP	UDP	Kerberos authentication system
90	TCP	UDP	dnsix (DoD Network Security for Inform
90	TCP	UDP	PointCast (dotcom)
99	TCP		WIP Message protocol
100		UDP	CyberGate RAT protocol
101	TCP	UDP	NIC host name

660	TCP		Mac OS X Server administration
666	TCP	UDP	Doom, first online first-person shooter
666	TCP		airserv-ng, aircrack-ng's server for remote-controlling wireless devices
674	TCP		Application Configuration Access Protocol (ACAP)

https://en.wikipedia.org/wiki/List_of_TCP_and_UDP_port_numbers

User Datagram Protocol (UDP)

Transmission Control Protocol (TCP)

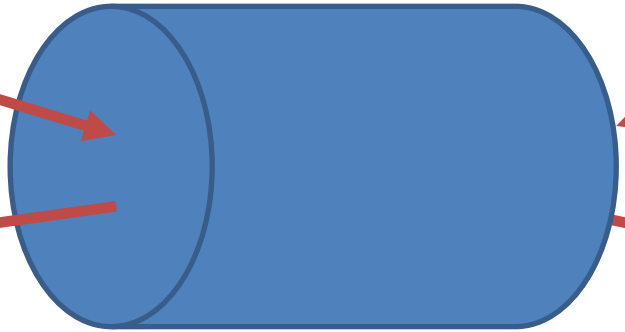
10.2.14.5:502

Output Stream

10	B4	22	18

19	4F

Input Stream



192.168.1.10:28

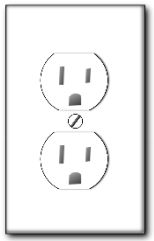
Output Stream

19	4F

10	B4	22	18

Input Stream

Connector



Listener

UDP vs TCP

	UDP	TCP
Speed	Fast	Slow
Reliability	Unsure	Guaranteed
Ordering	Unsure	Guaranteed

- TCP: Web browsing, email
- UDP: Streaming media, games

Tinkering

- Open a command prompt on your computer and enter the following commands:
  - “ipconfig /all”
  - “tracert google.com”
- What information are these commands giving?
- How does the output compare to the same commands running on your work (or other) computer?