

Internet

Derrick modified by Aidan

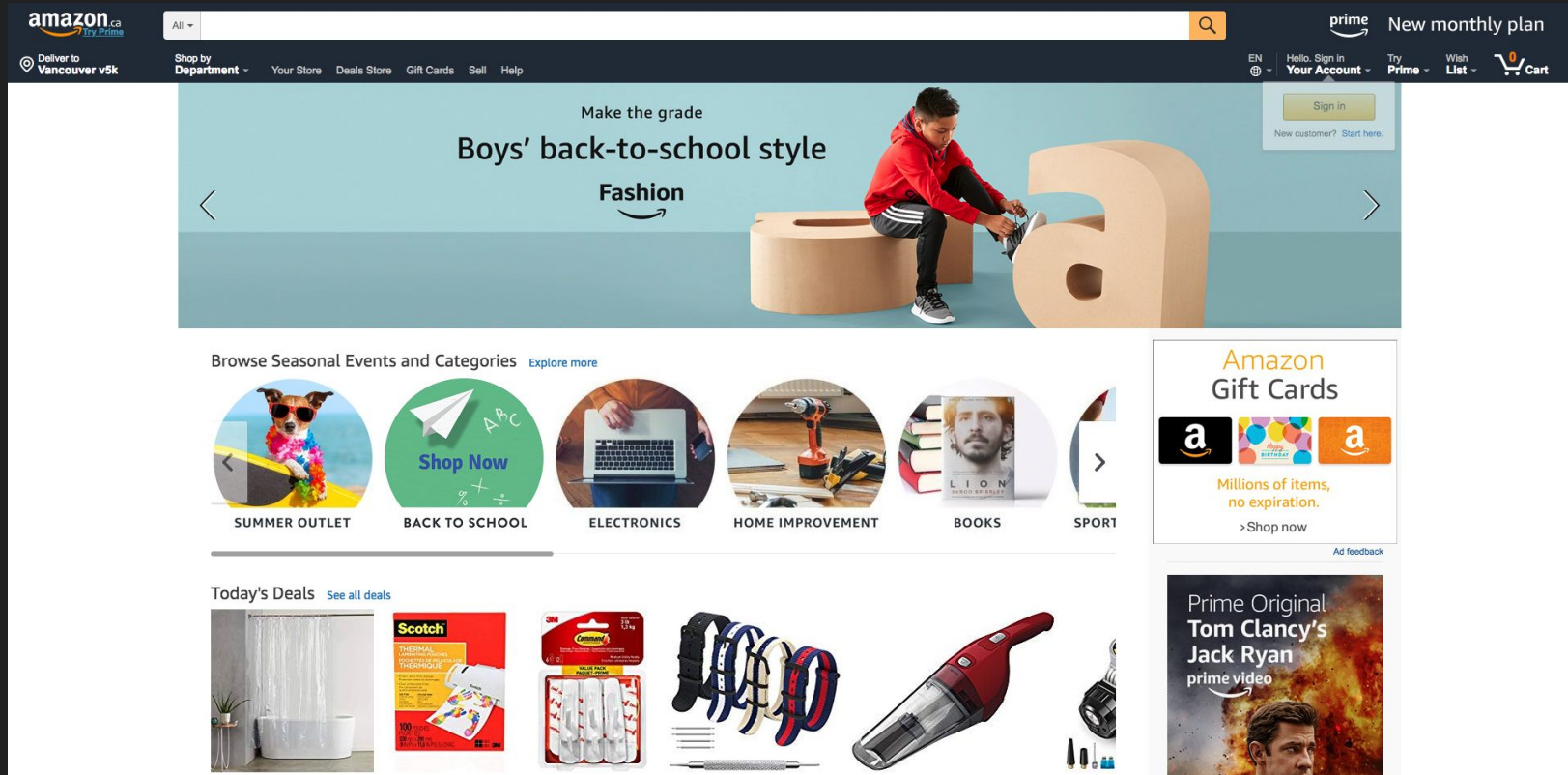
Communication

- How do we communicate with our friend on the phone?
 - “John Smith”
 - Look up his phone number in my contacts app.
 - Make a call
 - John responses

How do we talk to other computers?

- You type <http://www.amazon.ca> into your browser bar and press Enter. What happens?

Web page



The image shows the Amazon.ca homepage. At the top is a dark navigation bar with the Amazon.ca logo, a search bar, and links for 'prime', 'New monthly plan', 'Hello. Sign in Your Account', 'Try Prime', 'Wish List', and 'Cart'. Below the navigation bar is a large banner for 'Boys' back-to-school style' featuring a boy sitting on a large cardboard letter 'A'. The banner includes the text 'Make the grade' and 'Fashion'. Below the banner is a section titled 'Browse Seasonal Events and Categories' with a row of circular icons for 'SUMMER OUTLET', 'BACK TO SCHOOL', 'ELECTRONICS', 'HOME IMPROVEMENT', 'BOOKS', and 'SPORT'. To the right of this row is a 'Amazon Gift Cards' advertisement. Below the seasonal events is a 'Today's Deals' section with a row of product images including a shower curtain, a box of Scotch thermal tape, a package of 3M Command strips, a set of belts, a red cordless vacuum, and a set of tools. To the right of the deals is a 'Prime Original Tom Clancy's Jack Ryan prime video' advertisement.

amazon.ca
Try Prime

Deliver to
Vancouver v5k

Shop by
Department

Your Store Deals Store Gift Cards Sell Help

prime New monthly plan

EN Hello. Sign in Your Account Try Prime Wish List Cart

Make the grade
Boys' back-to-school style
Fashion

Sign in
New customer? Start here.

Browse Seasonal Events and Categories Explore more

SUMMER OUTLET BACK TO SCHOOL ELECTRONICS HOME IMPROVEMENT BOOKS SPORT

Shop Now

Amazon Gift Cards
Millions of items,
no expiration.
>Shop now

Ad feedback

Today's Deals See all deals

Scotch
THERMAL TAPE
100' x 1/2" x 3/4"

3M
Command
STRIPS
100' x 1/2" x 3/4"

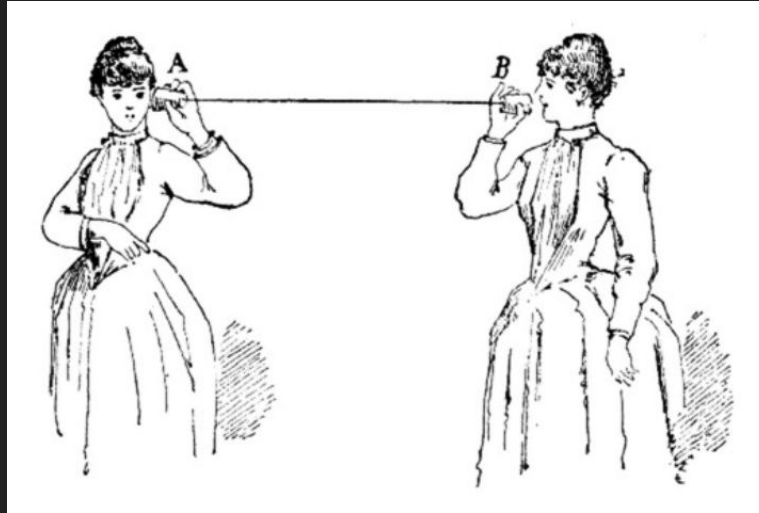
Prime Original
Tom Clancy's
Jack Ryan
prime video

Questions

- **What** is amazon.ca?
- **Where** is amazon.ca?
- **How** does my computer talk to amazon.ca?
- **What** does my computer say to amazon.ca?

Protocol

“A format and rules for exchanging information”



The OSI model

- A model to describe the how hardware and software work together

https://www.youtube.com/watch?v=y9PG-_ZNbWg

7	Application Layer	Human-computer interaction layer, where applications can access the network services
6	Presentation Layer	Ensures that data is in a usable format and is where data encryption occurs
5	Session Layer	Maintains connections and is responsible for controlling ports and sessions
4	Transport Layer	Transmits data using transmission protocols including TCP and UDP
3	Network Layer	Decides which physical path the data will take
2	Data Link Layer	Defines the format of data on the network
1	Physical Layer	Transmits raw bit stream over the physical medium

Internet Protocols layered, one protocol per task



Internet Protocol Suite (TCP/IP)

Application
Layer

- HTTP/FTP/SMTP/
etc.

Transport
Layer

- TCP/UDP

Network
Layer

- IPv4/IPv6

Link Layer

- 802.3 – Ethernet /
802.11 – Wireless
LAN

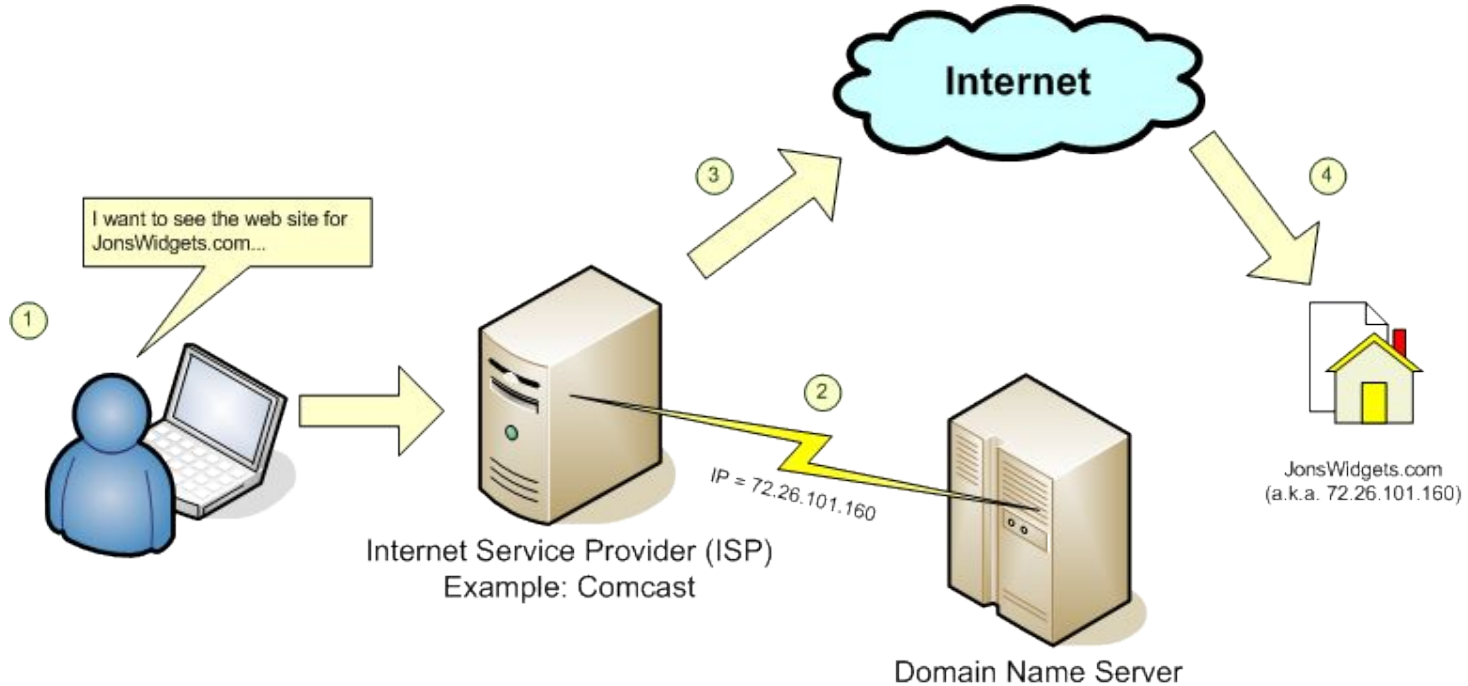
TCP Video

<https://www.youtube.com/watch?v=HFRU01uS9nA>

What is amazon.ca?

- Domain Name Service
 - DNS translates hostnames to addresses
- Amazon.ca ==> 54.239.19.238

DNS (Domain Name System)



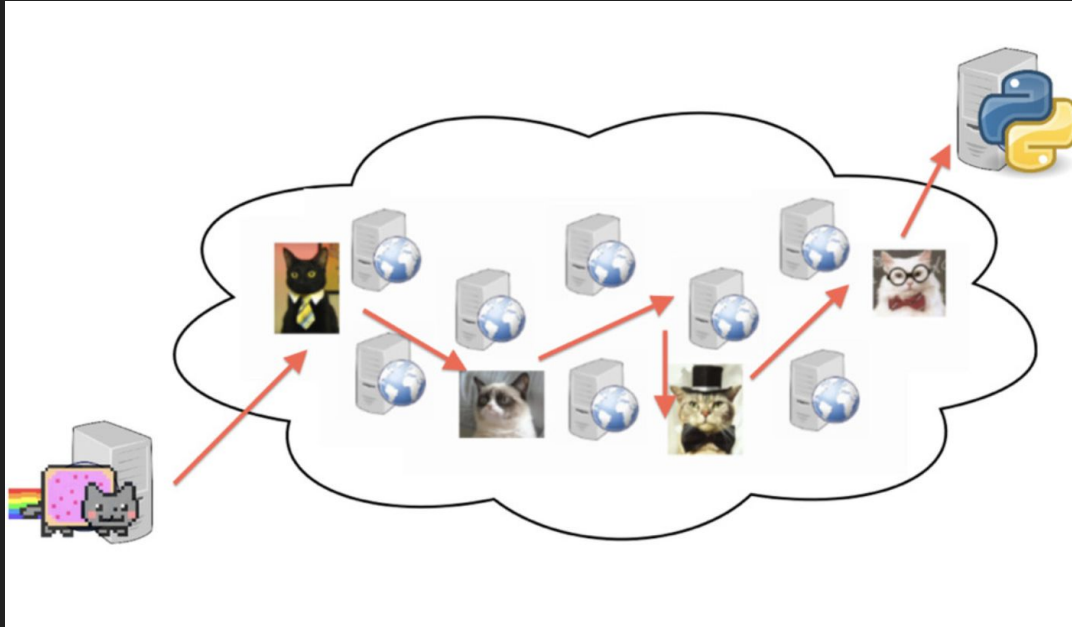
<https://www.youtube.com/watch?v=72snZctFFtA>

Where is amazon.ca?

- Internet Protocol
 - IP (54.239.19.238) handles addressing and routing
- [IP geolocation finder](#)

IP

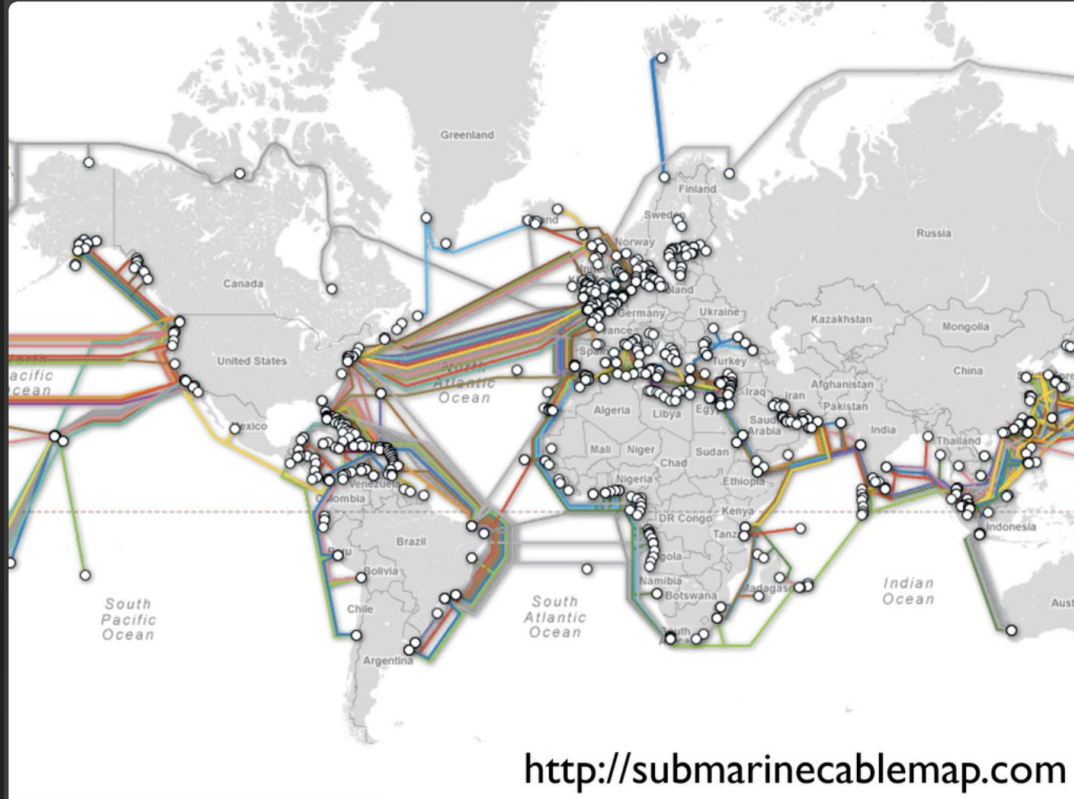
- Your packets of data hop from router to router through the internet to their destination.



Traceroute demo

```
park ~> traceroute amazon.ca
traceroute: Warning: amazon.ca has multiple addresses; using 52.94.225.242
traceroute to amazon.ca (52.94.225.242), 64 hops max, 52 byte packets
 1  192.168.86.1 (192.168.86.1)  2.343 ms  2.546 ms  1.215 ms
 2  192.168.0.1 (192.168.0.1)  2.548 ms  3.250 ms  1.433 ms
 3  amazon-a.ip4.torontointernetexchange.net (206.108.35.36)  50.728 ms  52.243 ms *
 4  * * *
 5  * 52.93.3.127 (52.93.3.127)  53.988 ms
    52.93.3.49 (52.93.3.49)  52.759 ms
 6  * * *
 7  *
```

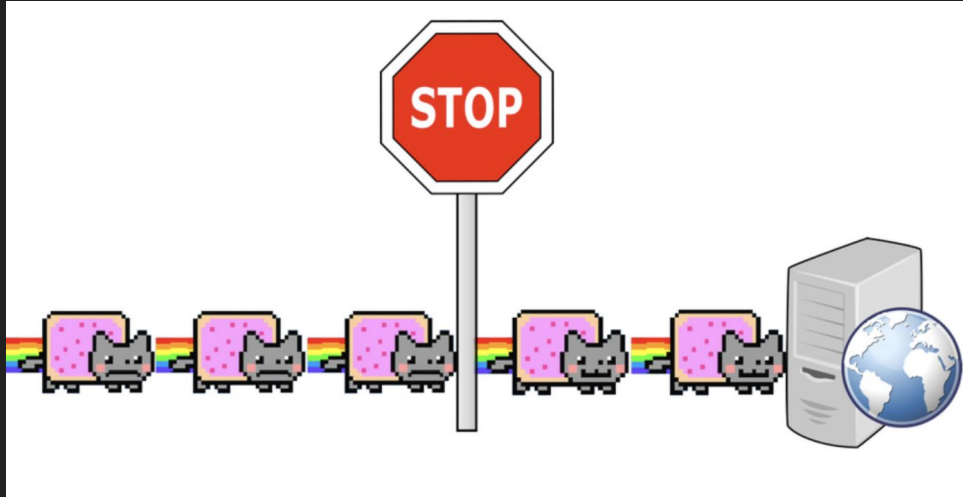
amazon.co.jp



[Submarine
cable map](#)

How does my computer talk to amazon.ca

- Transmission Control Protocol (TCP)
 - TCP **reliably** delivers data



Application-layer protocols that use TCP

- Web : HTTP/HTTPS
- Chat : IRC, XMPP/Jabber
- Email : SMTP, POP3, IMAP

Each application uses a different “port” number, so many different applications can use TCP to talk to an IP address at the same time.

What does my computer say to amazon.ca?

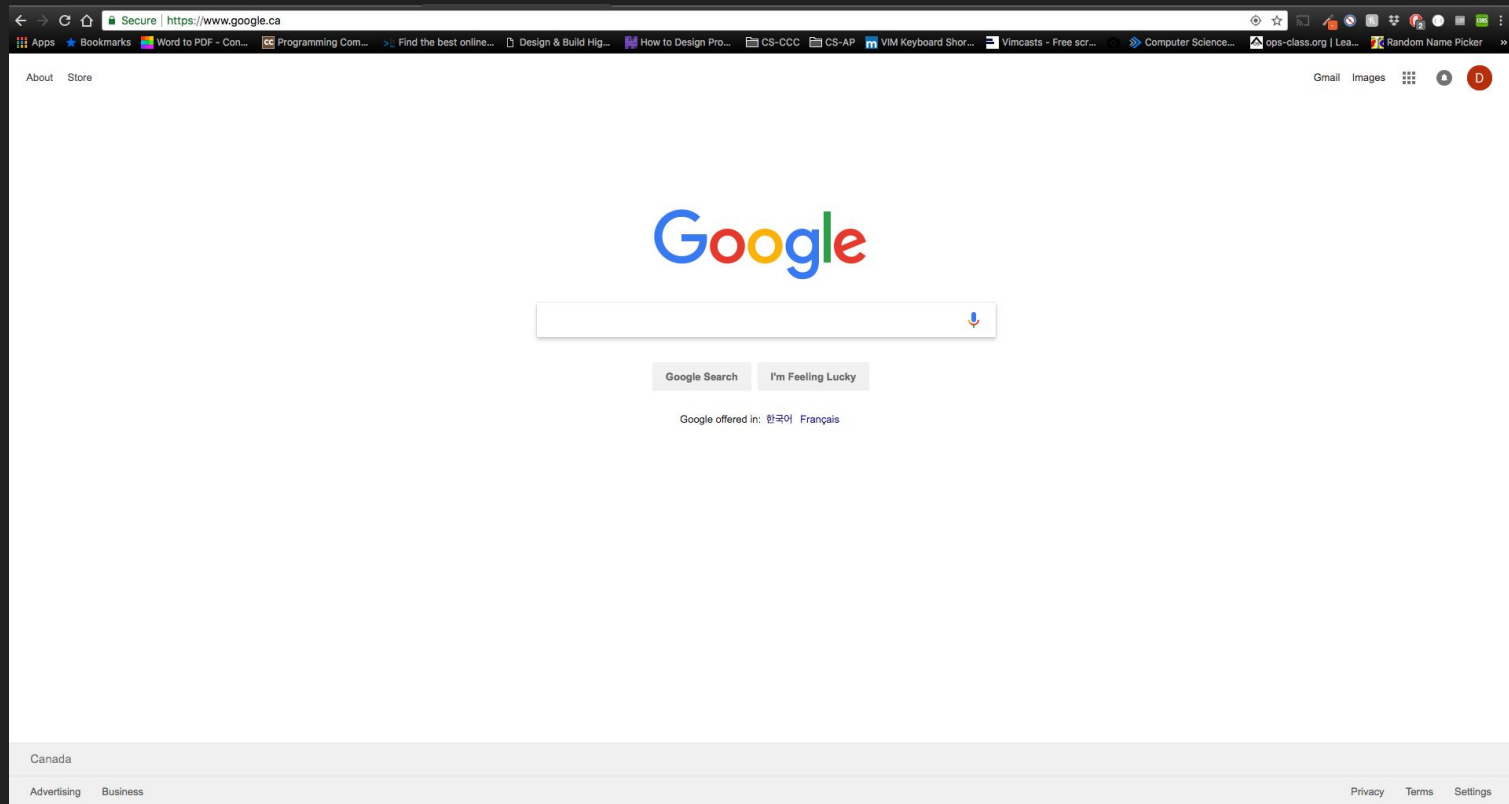
- HyperText Transfer Protocol (HTTP)
 - Clients use HTTP to request **resources** from servers.
- Resources
 - <http://www.amazon.ca>
 - HTML
 - Images
 - Textual or binary data
 - Dynamically-generated query results

How to be a web browser?

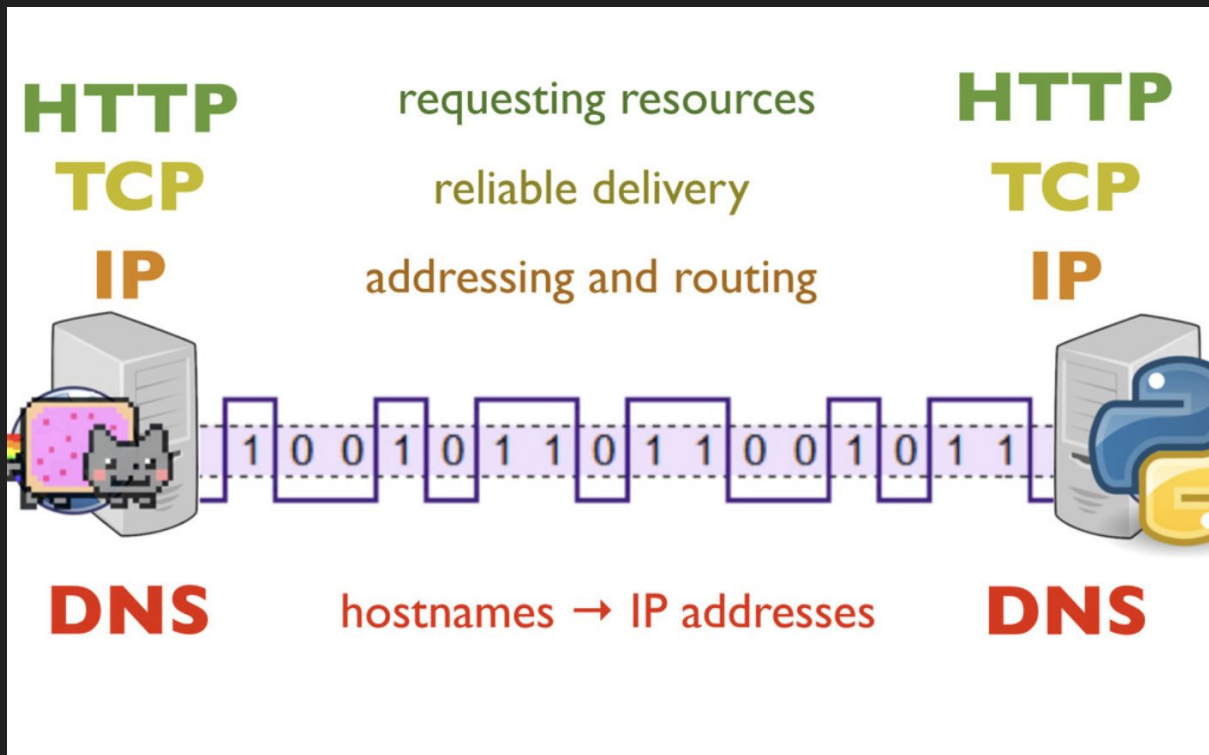
- telnet demo!

Telnet is a protocol used on the Internet or local area network to provide a bidirectional interactive text-oriented communication facility using a virtual terminal connection.

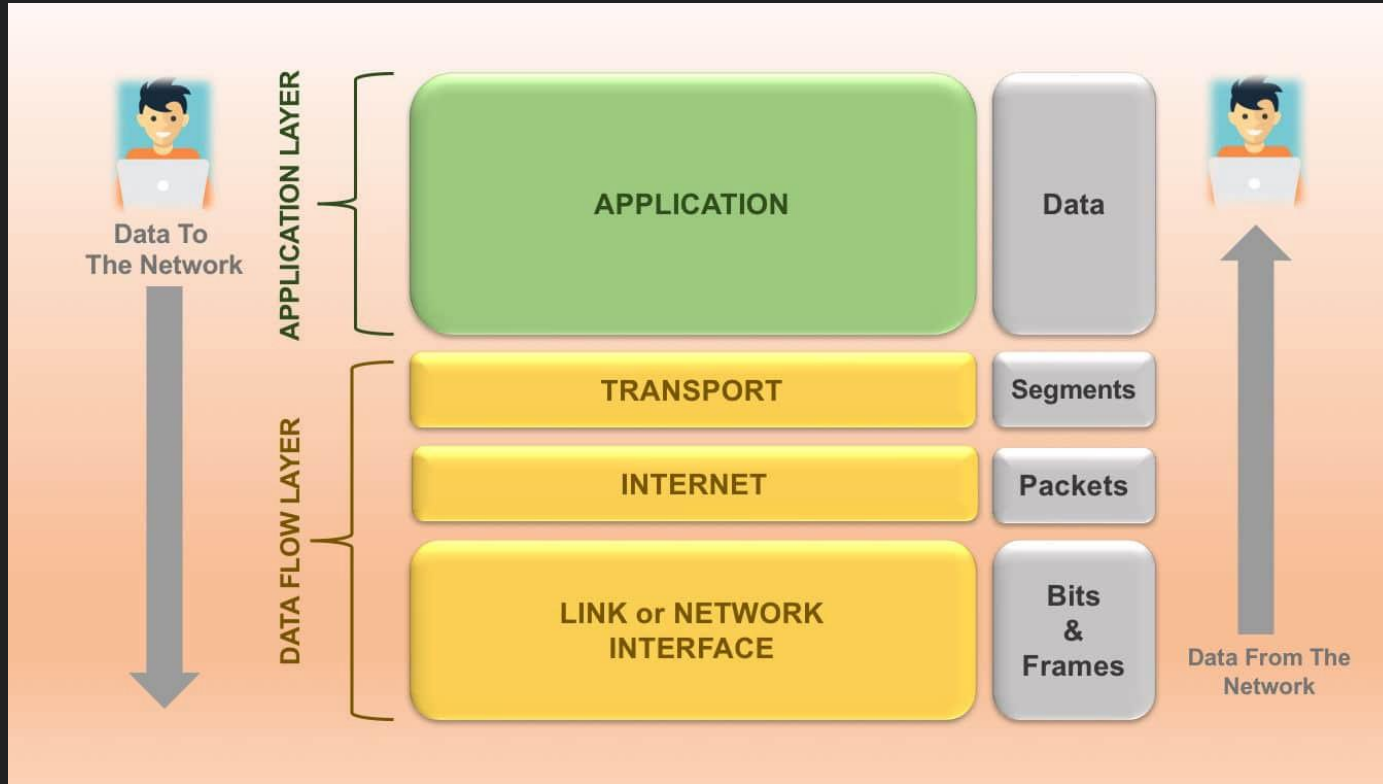
Browser knows how to render HTML



Review



Review



Videos

<https://www.youtube.com/playlist?list=PLzdnOPI1iJNfMRZm5DDxco3UdsFegvuB7>