

CS50 Lecture 8: Internet

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The Internet

- internet is the network of computers
- routers control where the data goes between the computers; they are computers themselves
- protocols are the basic agreed algorithms for communication between computers
- packets of data are sent around the internet
- **IP** stands for internet protocol. **IP Addresses** are unique for computers connected to the internet.
 - Routers have a table mapping IP addresses to cables each connected respectively to their own routers. The routers communicate with each other with their own protocols to route packets.
- **DNS** is provided by **Internet Service Providers (ISP)** to map things like `cnn.com` to actual IP addresses.
- **TCP** provides ability for a server at the same IP address to provide multiple services by appendign a **port number** to the end of the IP address.
 - can resend packets if it's not received. Asks for labeling/counting of packets.
 - net neutrality means that routers treat all packets equally.

Web Development

- The web is just one application on the internet. Zoom and email are others
- HTTP controls how we interact with TCP/IP packets
 - GET gets data, POST sends data.
- `https://www.example.com`
 - `https` is the secure version of `http`
 - `.com` is the top level domain. for commercial. some top level domains have restrictions.
 - `www` lets us know we're on the worldwide web. but it's optional because it's mostly implied.
 - `/` at the end requests a default file.
- An HTTP request might start:

```
GET / HTTP/1.1
```

```
Host: www.example.com
```

```
...
```

- ``GET`` means we are getting a file. ``/`` means a default file. Or more specific ``GET /index.html``
- Using version 1.1 of ``HTTP``.
- have to specify the website because the server might be hosting multiple.

- The response might be

```
HTTP/1.1 200 OK
```

```
Content-Type: text/html
```

```
...
```

- ``HTTP`` version followed by status code.
- Type of content included in packet

- Then the actual packet content.
 - We can type in an `http` web address and it will switch over to `https`. This gets http status code 301 Moved Permanently
 - Others include
 - 200 OK
 - 301 Moved Permanently
 - 304 Not Modified lets us use the cache.
 - 307 Temporary Redirect
 - 401 Unauthorized
 - 403 Forbidden
 - 404 Not Found
 - 418 I'm a Teapot
 - 500 Internal Server Error might be caused by buggy code on a server
 - 503 Service Unavailable

HTML

- Hypertext Markup Language
- An example

```
<!DOCTYPE html>

<html lang="en">
  <head>
    <title>
      hello, title
    </title>
  </head>
  <body>
    hello, body
  </body>
</html>
```