LESSON 13

HTTP AND ABSTRACTION ON THE INTERNET

GOALS: YOU WILL BE ABLE TO…

- Explain how layers of protocols allow the Internet to function

- Use developer tools in a modern browser to explore the HTTP traffic associate with visiting common websites

- Identify abstractions used in the development of Internet protocols

- Describe how a protocol or layer of the internet acts as an "abstraction" for other layers

GETTING STARTED: THE INTERNET PROTOCOL STACK

- We're rounding out our understanding of how the many protocols and systems of the Internet work together to make the Internet function.
  - We want to think of the protocols as working in "layers"
- All of this happens in the network software on each computer, whether that computer is your phone, a laptop, or a server like a DNS or web server (routers are a special case that only look at the IP layer)

THE INTERNET PROTOCOL STACK

- The important takeaway here is to understand that the system was constructed **with layers of abstraction** where each layer only needs to concern itself with its specific job, and then hands it off to another layer.
  - This makes the very complicated task of digital network communication possible
- At the top layer, for example, DNS just thinks it is "speaking DNS" to some other computer – the DNS protocol does not even need to know how the other layers work.
  - It just relies on them doing their jobs.
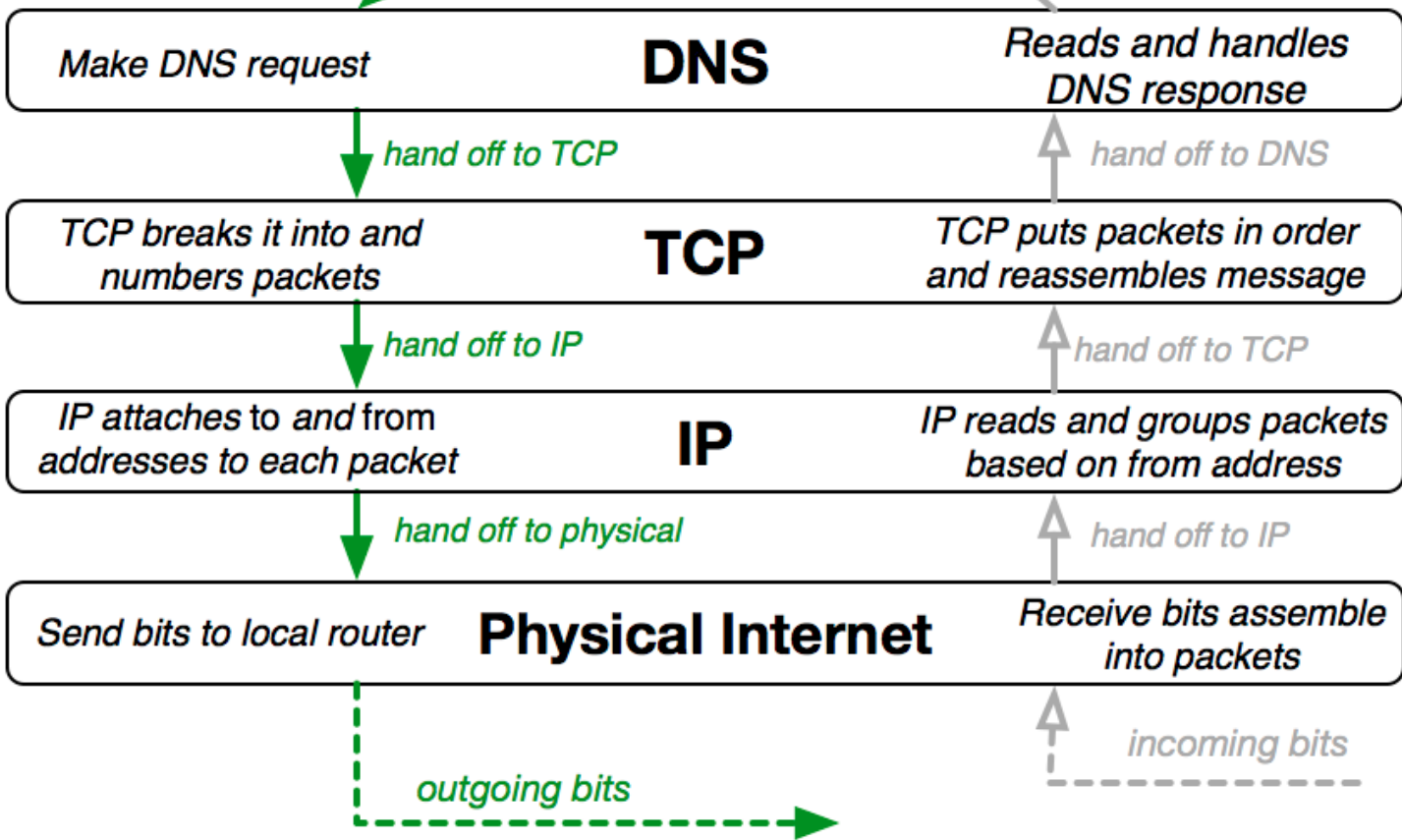
HTTP…

- Have you ever seen the letters "HTTP" anywhere while using the Internet?
  - http://code.org
- Today we will focus our attention on HTTP, which is a protocol that sits at the same "layer" as DNS – right above TCP

WHAT IS HTTP?

- HTTP is an ASCII text based protocol
- It's somewhat remarkable to note that many "high level" protocols, like HTTP, are just computers sending ASCII text messages back and forth. Each protocol simply defines the rules of the "conversation" between two machines.
- In the case of HTTP it is the protocol used for sending and receiving web pages and other web content.
- Today we'll look under the hood and see HTTP in action.

VIDEO: THE INTERNET: HTML AND HTTP

- Link: https://youtu.be/kBXQZMmiA4s

INVESTIGATE HTTP TRAFFIC ON YOUR COMPUTER

- We can actually watch HTTP traffic on our computers through tools in the web browser
- We are going to work through the "HTTP in Action – Worksheet"
- Before we start, we need to know two ideas:
  - Static web pages – simple, easy, written in HTML and CSS
  - Dynamic web pages – complex, uses HTML, CSS, AND website scripting
    - To make an "interactive web app"
    - To be able to share HTML code between the pages
    - Source: (http://www.codeconquest.com/website/static-vs-dynamic-websites/)

WRAP-UP: DISCUSSION

- What surprised you about the HTTP traffic you observed?

- What does it mean to say that high-level layers of the Internet use low-level layers "abstractly"?

- What other examples of abstraction have we seen in this course? (hint: all of unit 1)

VOCABULARY:

- DNS: The service that translates URLs to IP addresses
- HTTP: HyperText Transfer Protocol – the protocol used for transmitting web pages over the Internet
- IP Address: A number assigned to any item that is connected to the Internet
- TCP: Transmission Control Protocol – provides reliable, ordered, and error-checked delivery of a stream of packets on the internet. TCP is tightly linked with IP and usually seen as TCP/IP in writing
- URL: An easy-to-remember address for calling a web page (like www.code.org)