HTTP Tips and Tricks
First: Networking Jokes and Trivia

- UDP
- HTTP
- HTTP 418
  - “The HTCP server is a teapot; the resulting entity body may be short and stout.”
  - “There is a strong, dark, rich requirement for a protocol designed espressoly for the brewing of coffee.”
HTTP Request Types

- GET
  - Page, please
- HEAD
  - Metadata, please
- POST
  - Here’s some data—update what you have
- PUT
  - Here’s some data—create a new resource
- CONNECT
  - Make a tunnel for me through your proxy!
CONNECT and Tunneling

• CONNECT requests say, "give me a tunnel!"
• Used for communication via proxies
• It’s a virtual connection—it means "forward all of the packets that I send to the destination, and vice-versa"
• You don’t have to use CONNECT with proxies...
• But you do when HTTPS/SSL is used... why?
HTTP Headers: Host

• Specifies the hostname (and, optionally, the port) to which to send a request

• Example:
  GET /Passport.aspx?popup=1 HTTP/1.1
  Host: www.bing.com
  User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64; rv:34.0) Gecko/20100101 Firefox/34.0
  Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
  Accept-Language: en-US,en;q=0.5
HTTP Headers: Connection

• Standard header for keep-alives
  • “Connection: keep-alive” is sent to keep a connection alive
  • If you don’t want to keep it alive, send “Connection: close”
  • We’ll rewrite packets to do this for the proxy project

• Also used to switch from HTTP /1.1 to HTTP/2
  • Client sends “Connection: upgrade” to do this

• Example:
  GET /ajax/libs/jquery/1.7.1/jquery.min.js HTTP/1.1
  Host: ajax.googleapis.com
  Connection: keep-alive
  Accept: */*
HTTP Headers: Proxy-Connection

• Same functionality as a “Connection” field in the header
• Actually came from a mistake made by Netscape developers; it wasn’t in the standard but they used it anyway
• Now seen occasionally, but does the same thing as “Connection”
Buffering Requests

- When writing a proxy, you may want to buffer requests.
- This is a good idea to keep your network traffic and thread consumption reasonable.
- (Proxies that don’t buffer often crash)
TCP Streams

• UDP sends a string of messages; no concept of “connection”
• TCP is like a direct pipe from one node to another
  • No concept of message boundaries
  • Easy to associate data with the data that preceded it
  • Gives you guarantees that data you send will arrive
Binary Streams vs. Text Streams

• Important when writing code to think about if you’re reading text or arbitrary binary data

• If you use APIs for reading text buffers to read your binary headers, you’re going to have a bad time
  • Binary bytes can be misinterpreted as text-related commands by text buffer readers and not properly received
  • Text buffer readers may try to read in UTF-8, which formats byte strings very differently and will cause issues

• In Java, this means use ByteStream instead of InputStream

• With Python, if you use socket.recv() you shouldn’t have problems
Gateways

• General term for network nodes that bridge a boundary between networks that use different protocols
• Often package internet packets to travel and get routed through networks where they wouldn’t normally work
• In Tor, your Tor nodes will act as gateways
Real-Life Demo