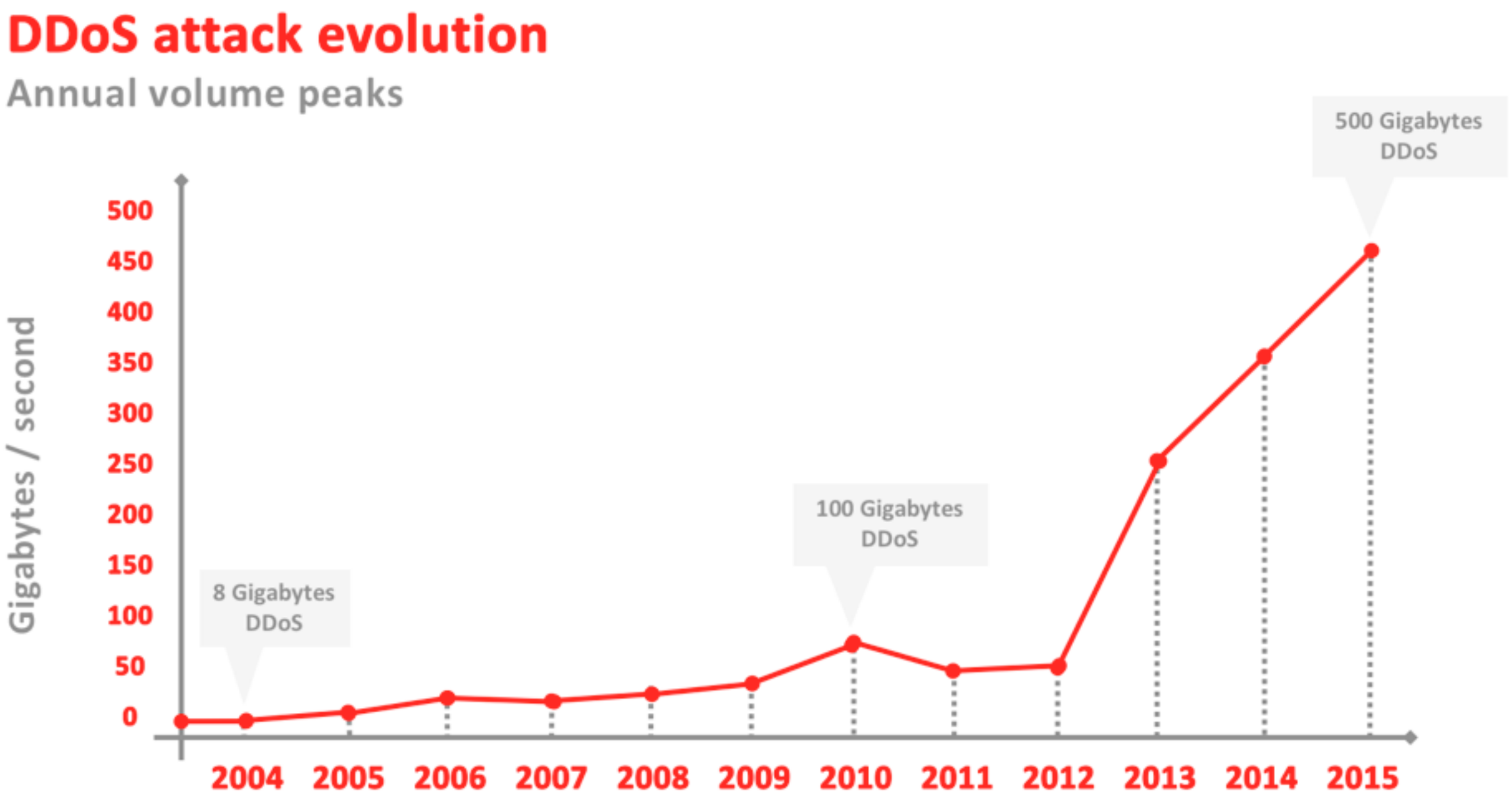
CS 110

Summer 2018

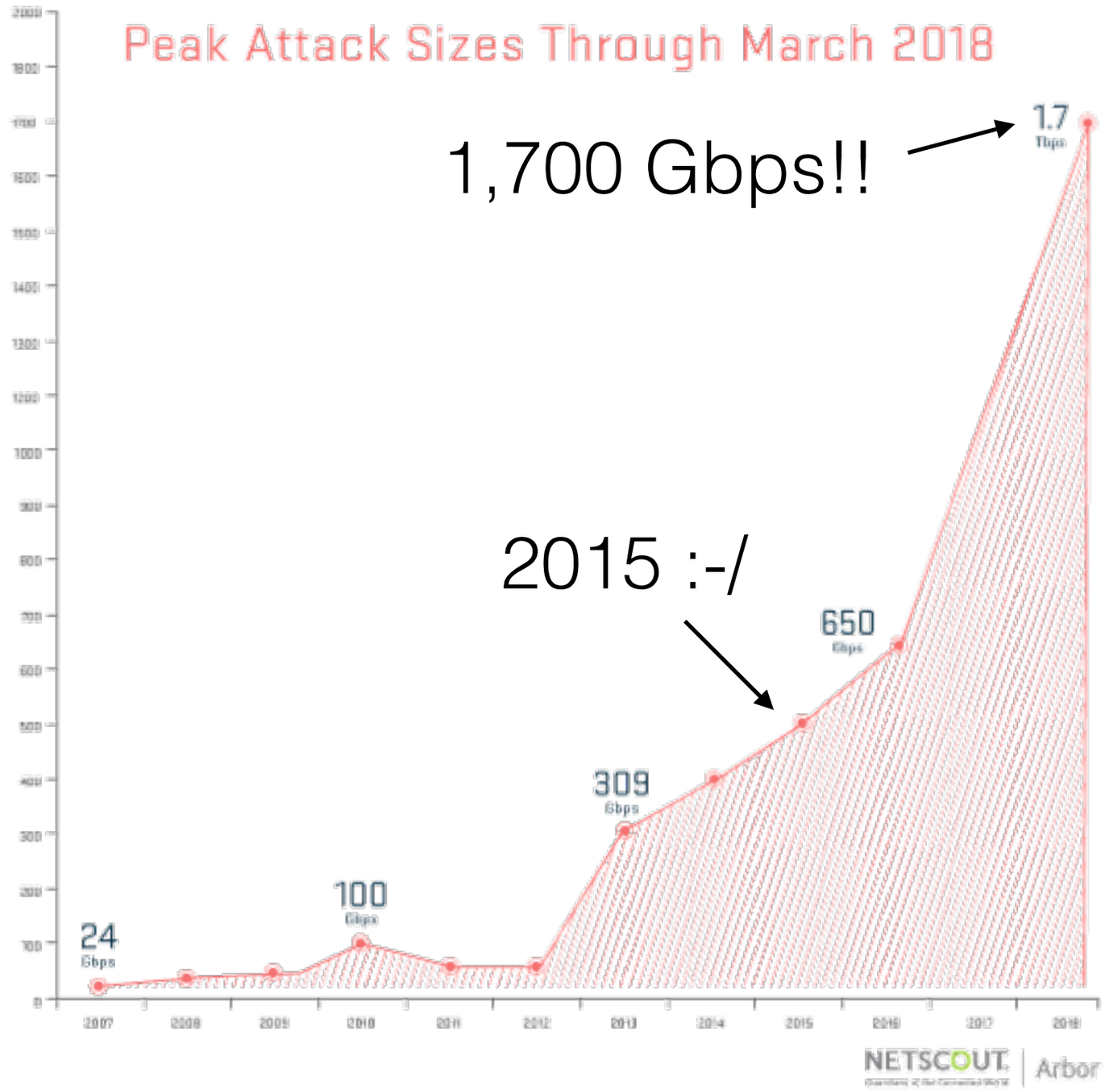
Ryan Eberhardt

DDoS Attacks



https://www.reveelium.com/en/ddos-attacks-the-cyber-boogeyman-part-i/

DDoS Attacks



https://asert.arbornetworks.com/netscout-arbor-confirms-1-7-tbps-ddos-attack-terabit-attack-era-upon-us/

Cloudflare

133 *datacenters*

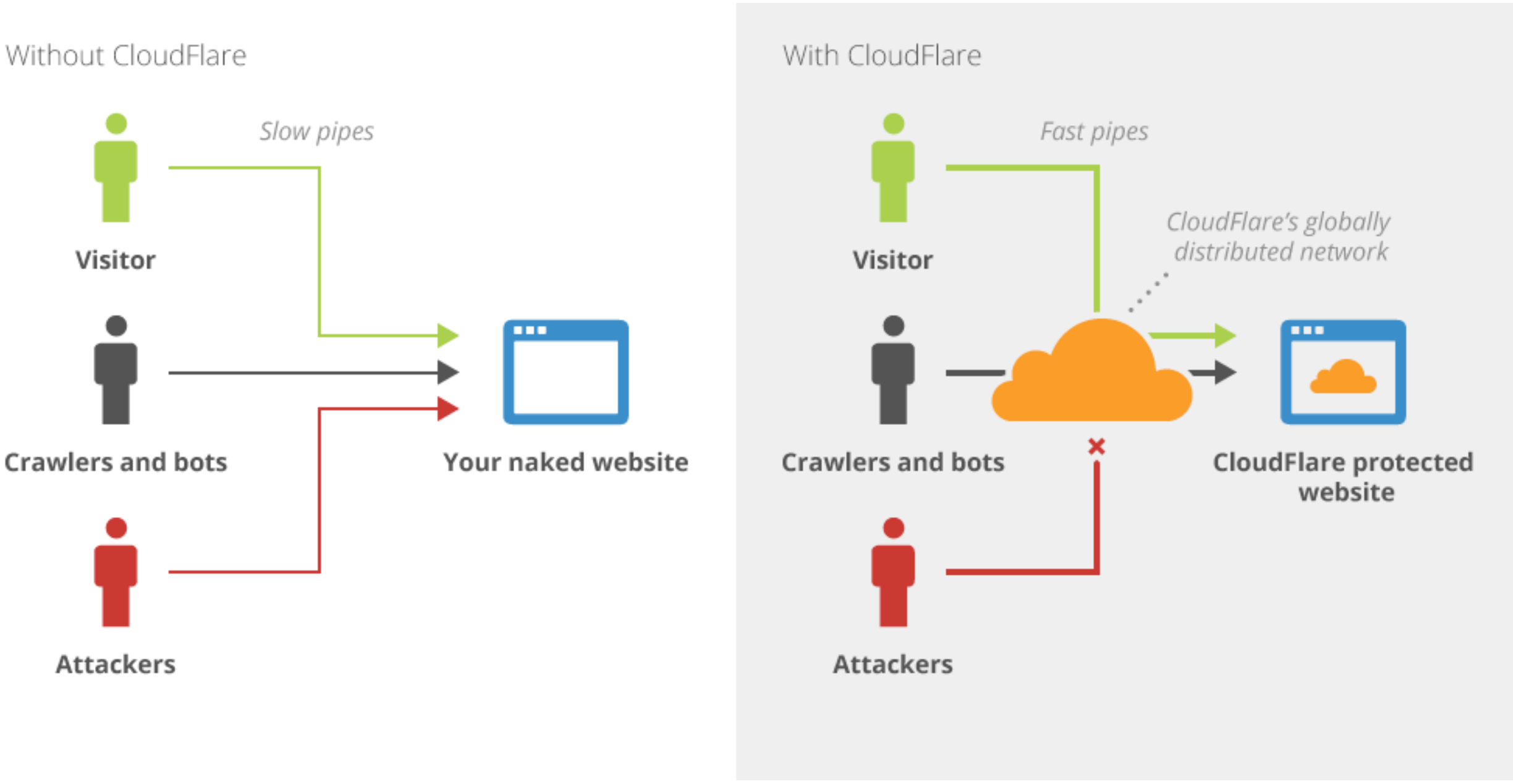
https://blog.cloudflare.com/usa-expansion/

Cloudflare

133 *datacenters*

https://www.cnbc.com/2014/12/22/cloudflare-to-open-a-data-center-a-week-in-2015.html

Cloudflare



https://support.cloudflare.com/hc/en-us/articles/205177068-Step-1-How-does-Cloudflare-work-

Disney: Large-scale rendering

Without global illumination:

https://www.disneyanimation.com/technology/innovations/hyperion

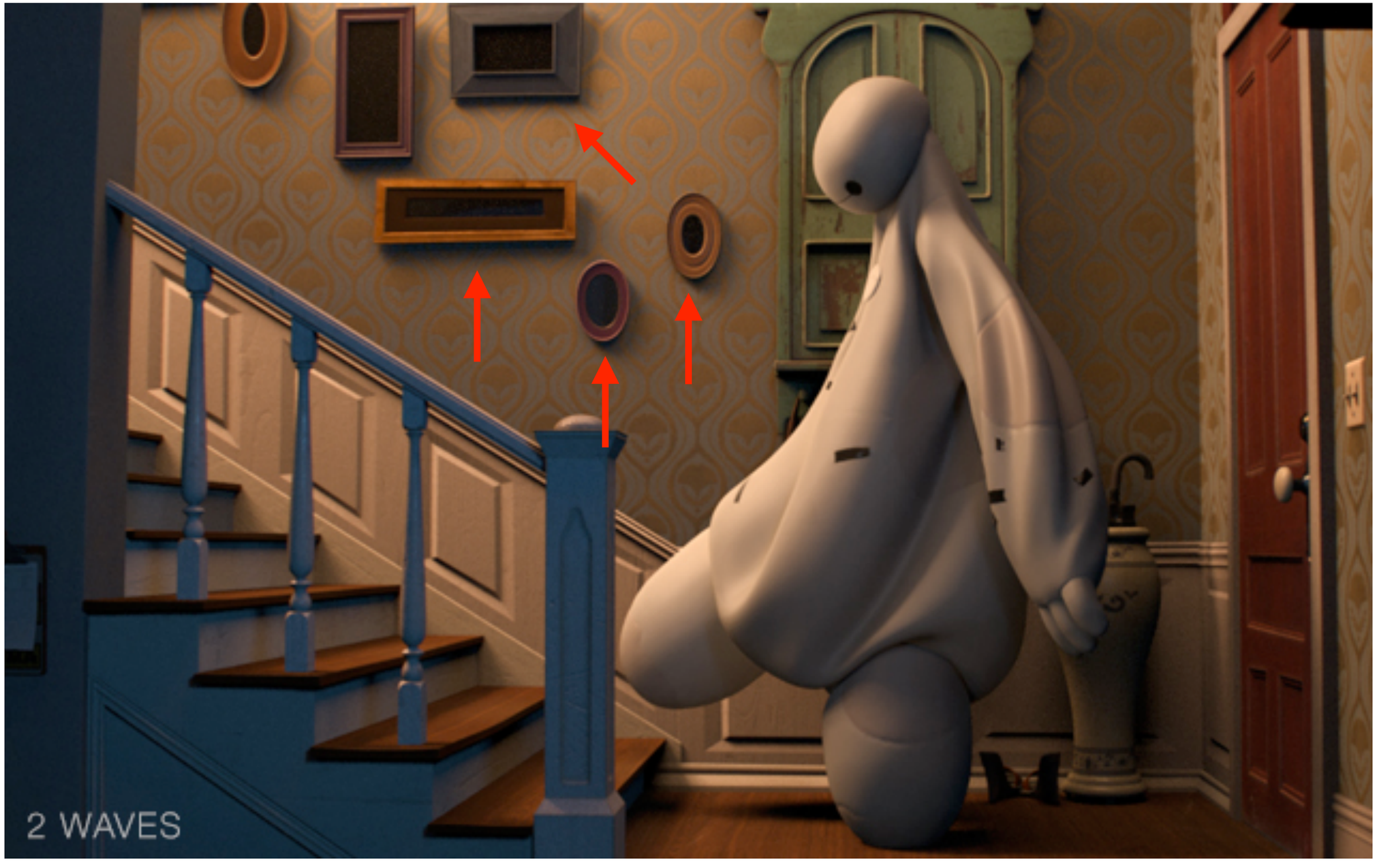
Disney: Large-scale rendering

With global illumination:

https://www.disneyanimation.com/technology/innovations/hyperion

Disney: Large-scale rendering

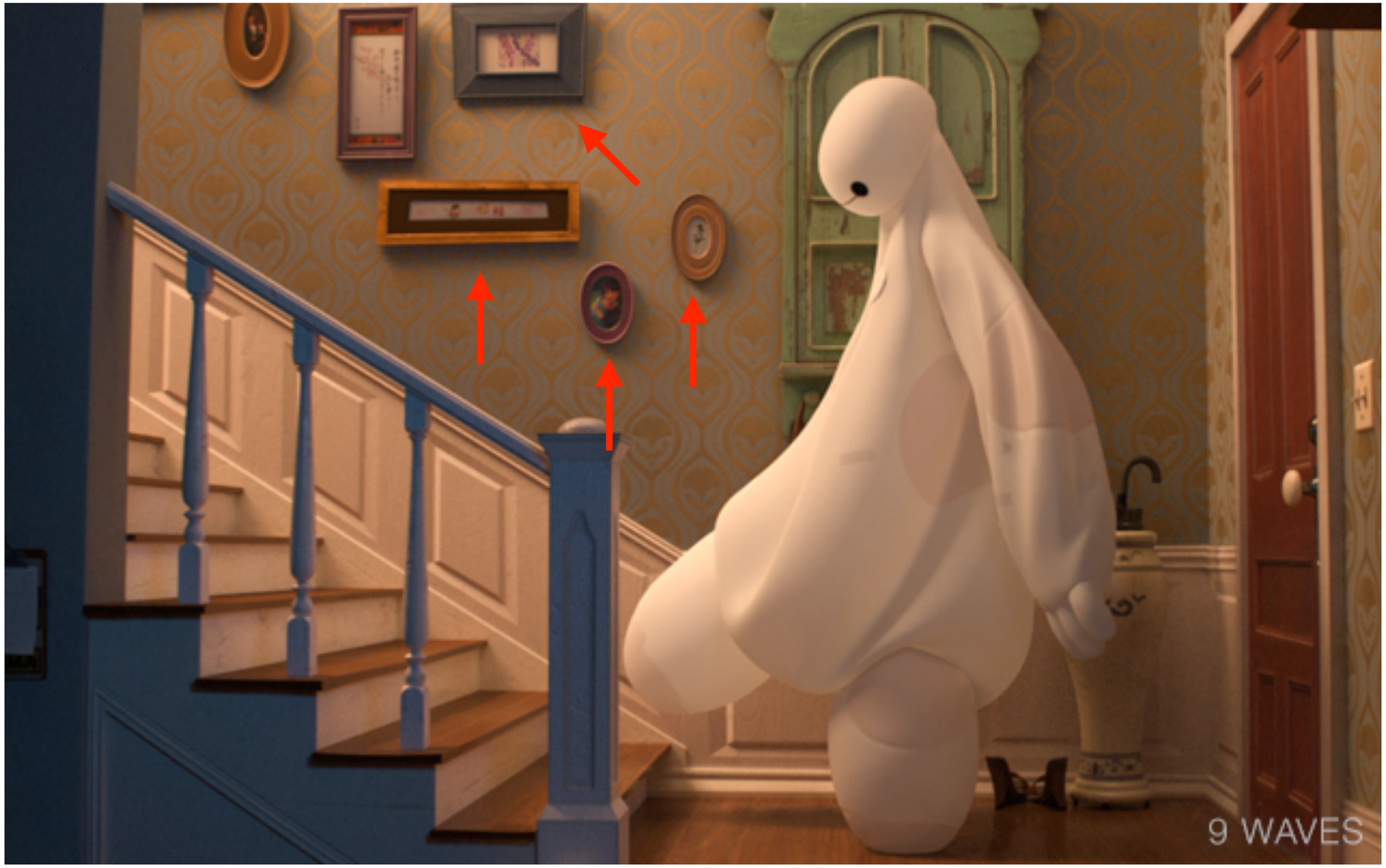
Without global illumination:



https://www.disneyanimation.com/technology/innovations/hyperion

Disney: Large-scale rendering

With global illumination:



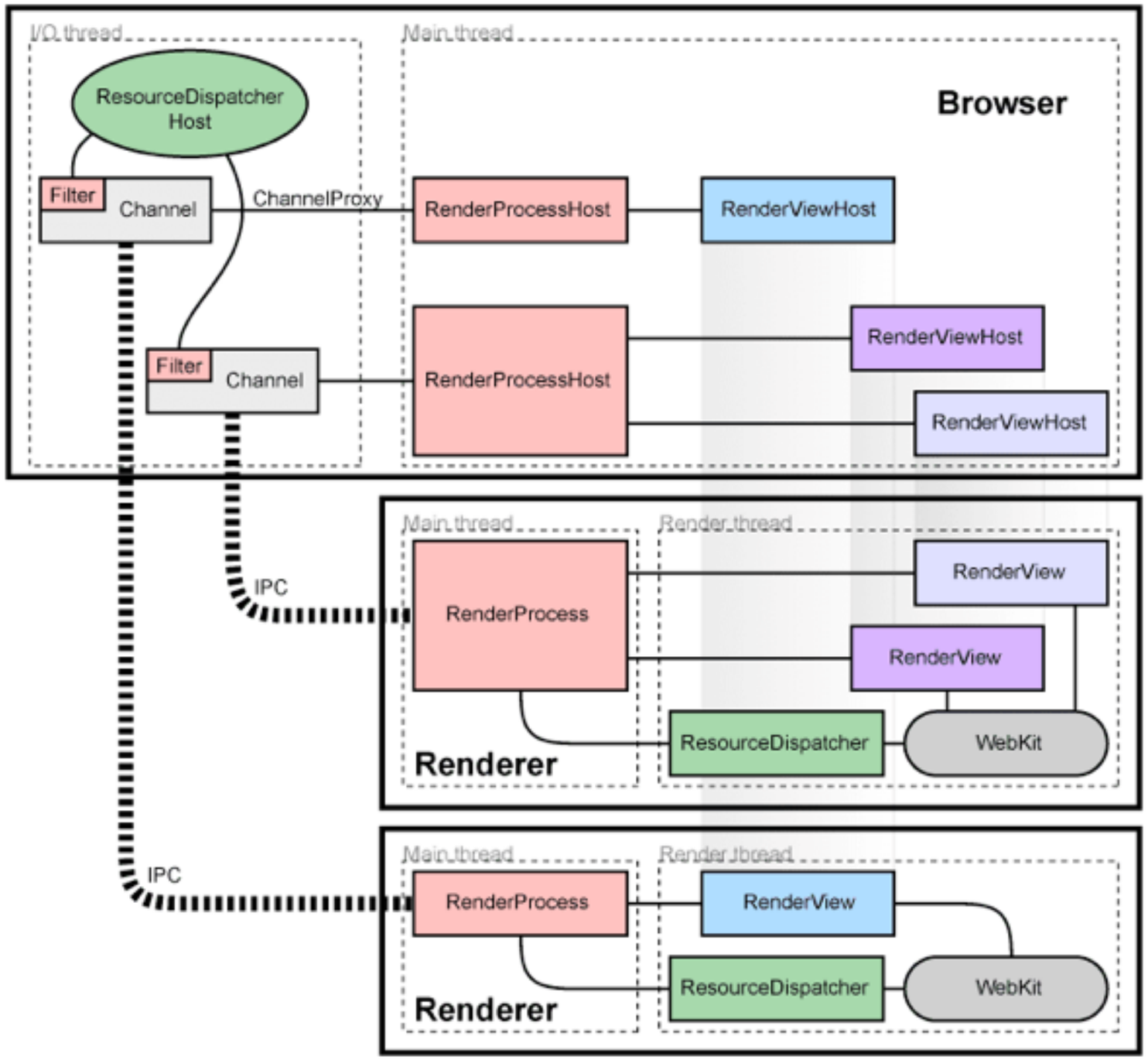
https://www.disneyanimation.com/technology/innovations/hyperion

Disney: Large-scale rendering

- "San Fransokyo" contains 83,000 buildings, 260,000 trees, 215,000 streetlights, and 100,000 vehicles. City detail is based on assessor data from San Francisco
- Rendered in four geographically-distributed datacenters
- 55,000 CPU cores, 400 TB of memory
- Many system failures!

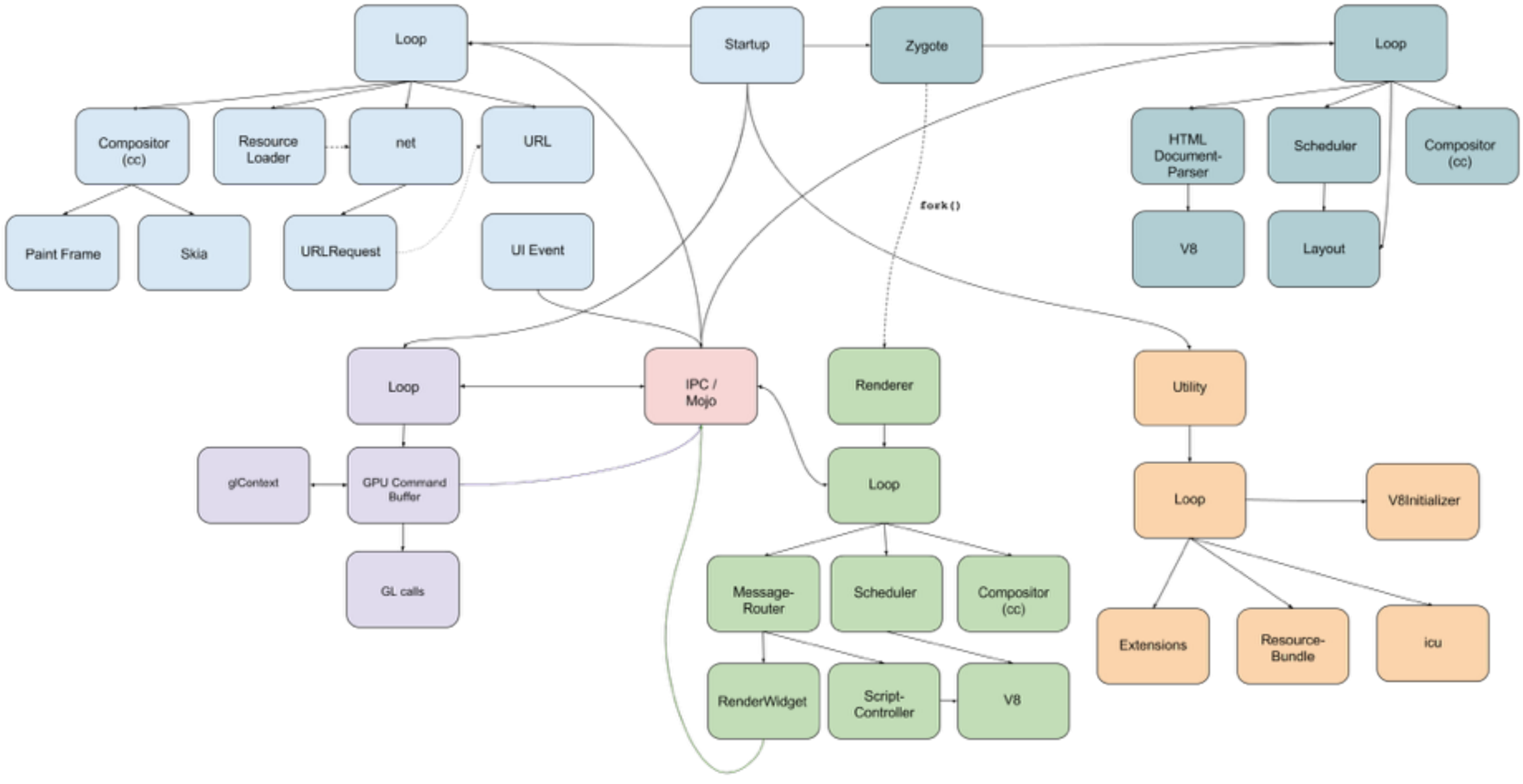
https://www.engadget.com/2014/10/18/disney-big-hero-6/
http://www.electronicdesign.com/blog/disney-supercomputer-renders-big-hero-6

Google Chrome: More complex than you think!



https://www.chromium.org/developers/design-documents/multi-process-architecture

Google Chrome: More complex than you think!



http://szeged.github.io/sprocket/architecture_overview.html

Google Chrome: More complex than you think!

- Performance considerations: browsing the web should be fast
- Architecture considerations: new web technologies are enabling sophisticated web applications
  - Multithreaded javascript (web workers)
  - HTML5 media APIs
  - High-performance 3D graphics via OpenGL/WebGL
  - Even raw assembly execution! (WebAssembly)
- Security considerations: we need to keep your bank account safe from shady websites
- The modern browser is sort of its own operating system!

Course website

https://cs110.stanford.edu

CS 110

- This class is well-oiled…
- But also somewhat of an experiment
  - I have never taught CS 110 before
  - CS 110 has never been taught over the summer (by anyone)
- The course scheduling and lecture pacing are somewhat of an experiment
- Weekly surveys: nominal amount of extra credit

Ways to get help

- Office hours
- Piazza
- Slack
- Summer Academic Resource Center
- Email me if you need more resources or support!

Assignment policies

- We generally won't look at your code
- No late days
- Assignments turned in within 24 hours of the deadline are capped at 90%
- Assignments turned in within 48 hours of the deadline are capped at 60%

Labs / discussion sections

- Optional
- Thursdays and Fridays
- Start *this week!* Sign up on the course website