Load Time

Time it takes full web page to render in the browser. Measured in seconds.
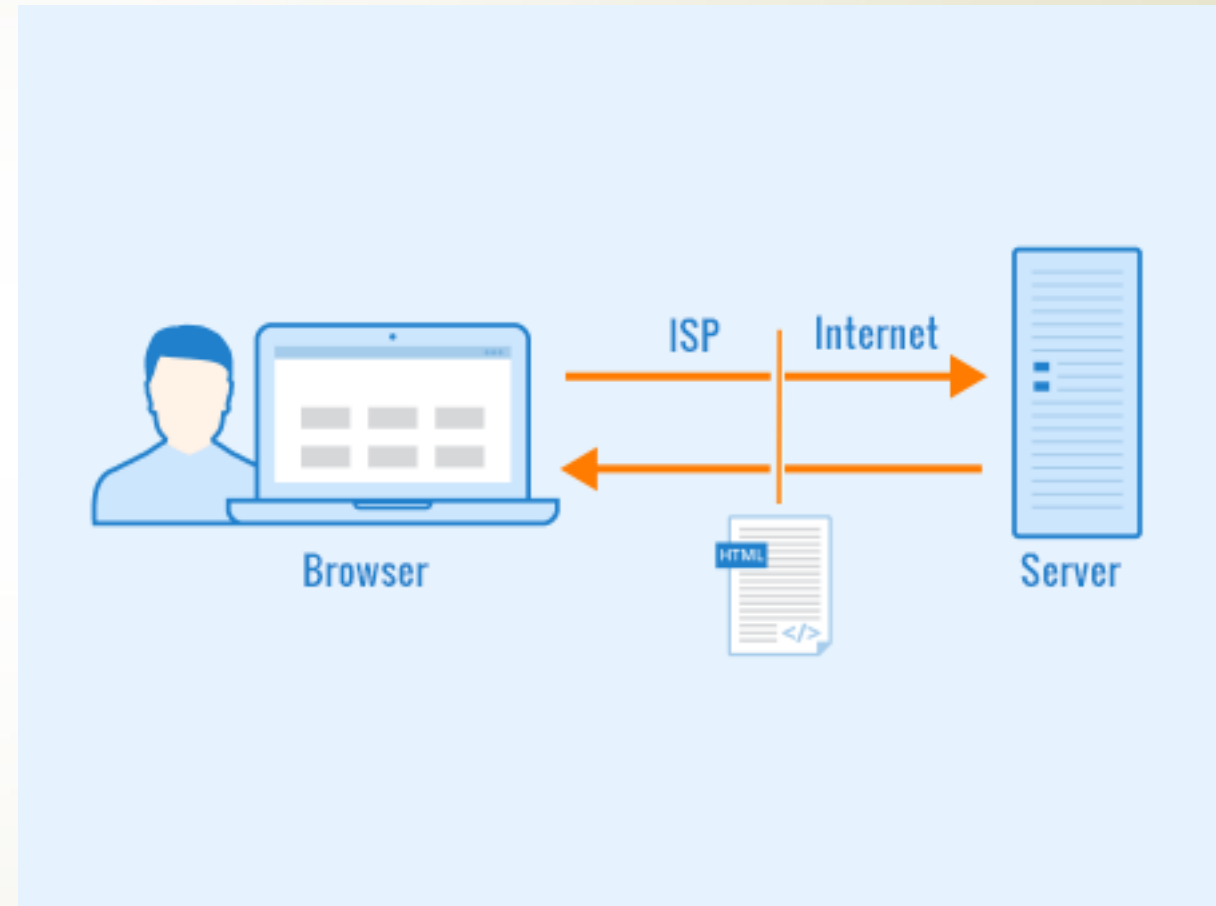
Web Server/Client (Browser)

Client (browser) requests a resource

- Web page

- Image

- CSS

- etc.

Server returns resource

Both directions - ISP (Internet Service Provider) and Internet

Simple Download Time

Depends on connection speed and file sizes

Page is made up of multiple files
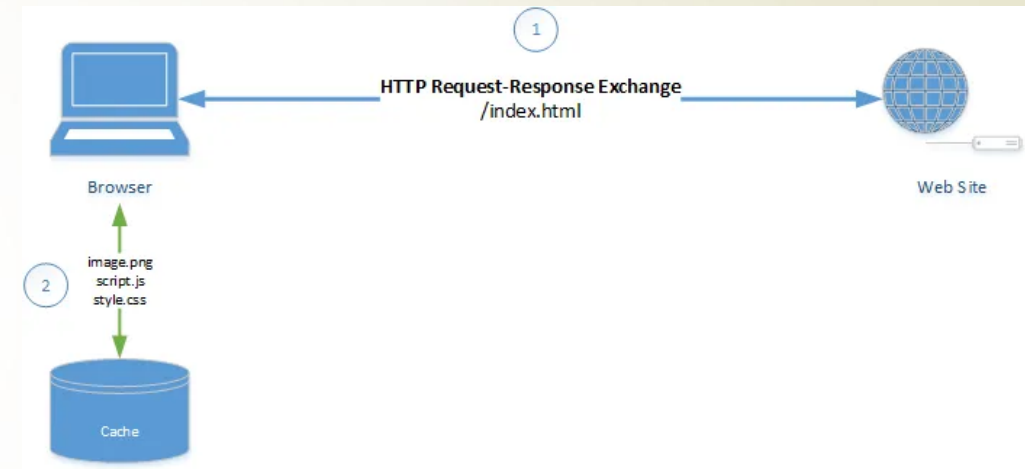
Page size is total of all files

Add by hand, or see WebPageTest tool

www.webpagetest.org

Browser Cache

- Browser cache—stores recently downloaded files

- Default size 50M - configurable

- Max cache size 1024M (1G)

- Deletes older files when full

- Disk cache (view in Firefox - about:cache)

Nielsen Guidelines

- < 0.1 sec – Instantaneous

- <1.0 sec – User Thought uninterrupted

- 10 sec – Limit for keeping user's attention

www.nngroup.com/articles/response-times-3-important-limits/
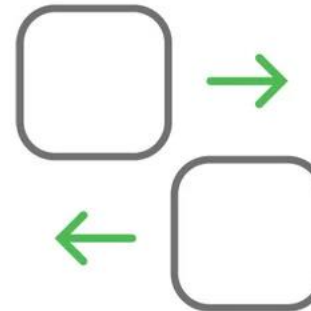
Google Guidelines

- Slow sites have a negative impact on revenue
- 40% of shoppers will wait no more than three seconds before abandoning a retail or travel site
- Slow site/app - 29% of smartphone users will immediately switch to another site/app
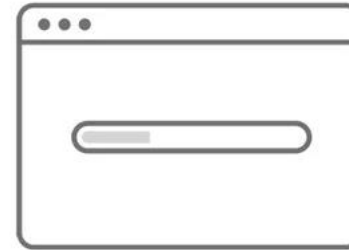
40%
of shoppers will wait no more than three seconds before abandoning a retail or travel site.

29%
of smartphone users will immediately switch to another site or app if it doesn't satisfy their needs (e.g. they can't find information or it's too slow)
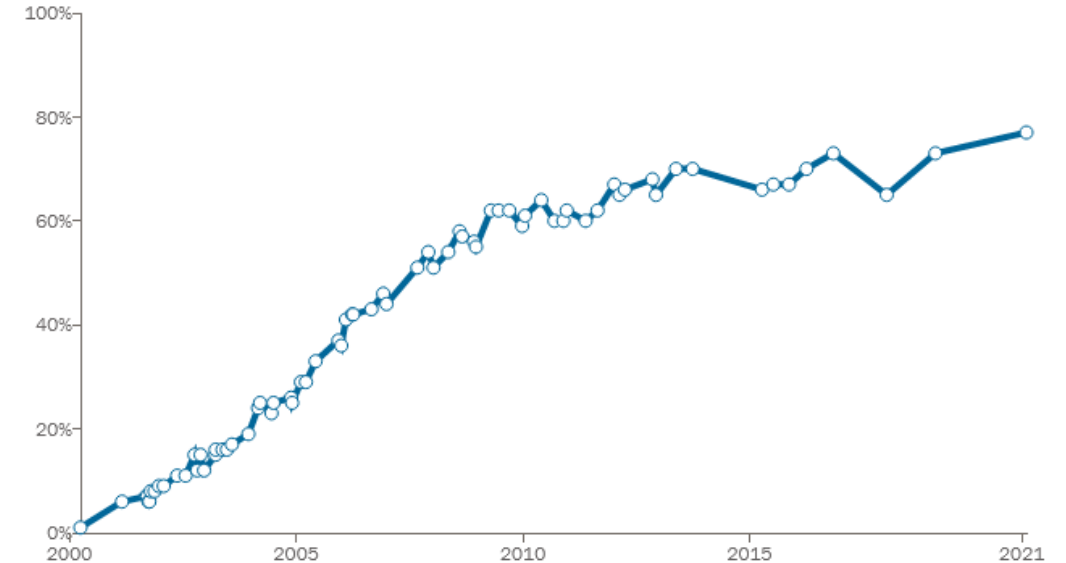
Home Broadband

- 95% of US adults use internet

- ~77% of adults have home broadband

Home broadband use

% of U.S. adults who say they have a broadband connection at home

Note: Respondents who did not give an answer are not shown. The Center has used several different question wordings to identify broadband users in recent years, which may account for some variance in broadband adoption figures between 2015 and 2018. Our survey conducted in July 2015 used a directly comparable question wording to the one conducted in January 2018.
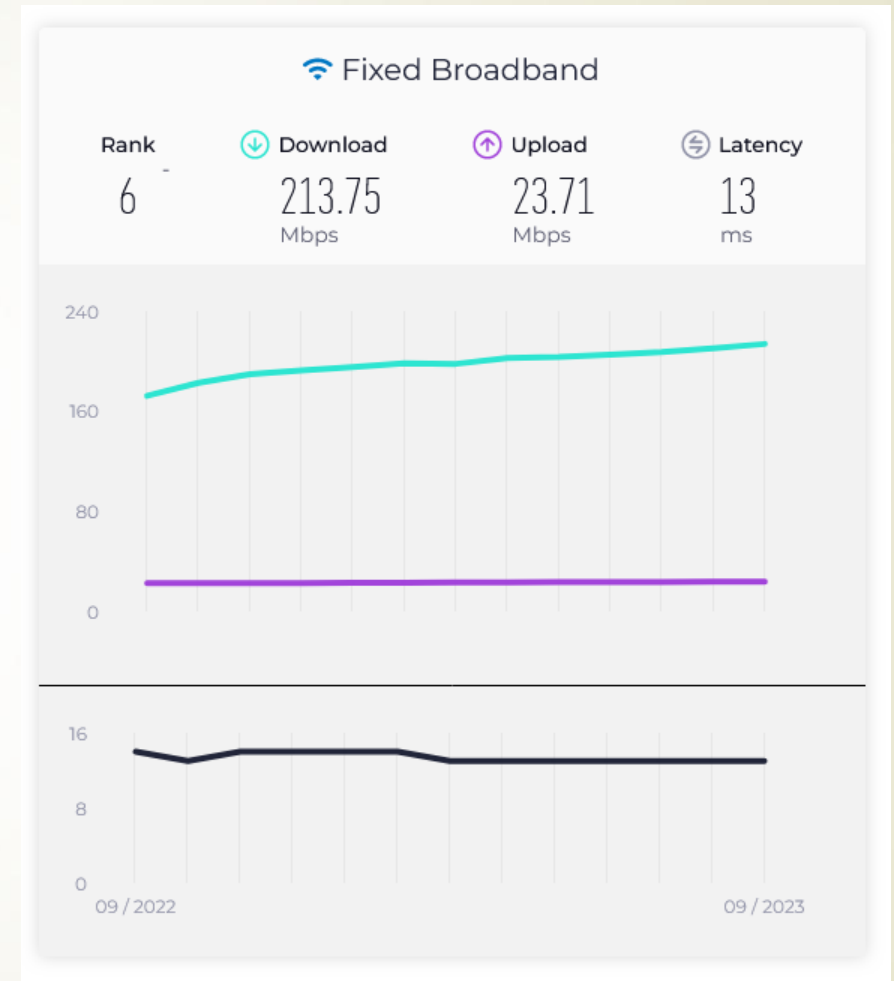Source: Surveys of U.S. adults conducted 2000-2021.

PEW RESEARCH CENTER

Chart   Data   Share

Home Broadband Speed

- Average fixed broadband speed U.S. 214 Mbps
- https://www.speedtest.net/global-index/united-states
- 486 Mbps in my house this morning - Fiber Optic
- Google "Speed Test"

Mobile Broadband Speed

- ~15% of adults smartphone internet only

- Mobile internet penetration ~75%

- Average mobile broadband speed 97M U.S

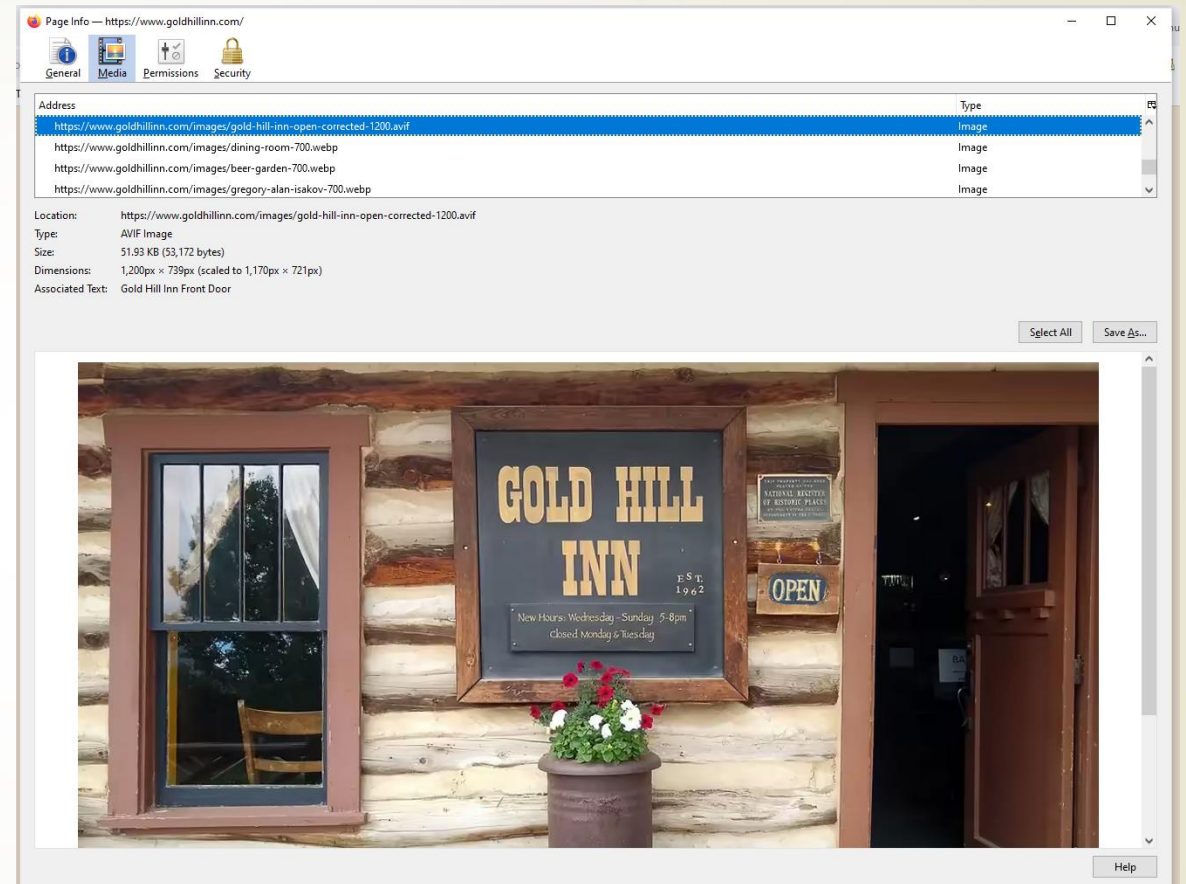- Real world speeds often much lower - examples: motel connections, mobile connections outside urban areas
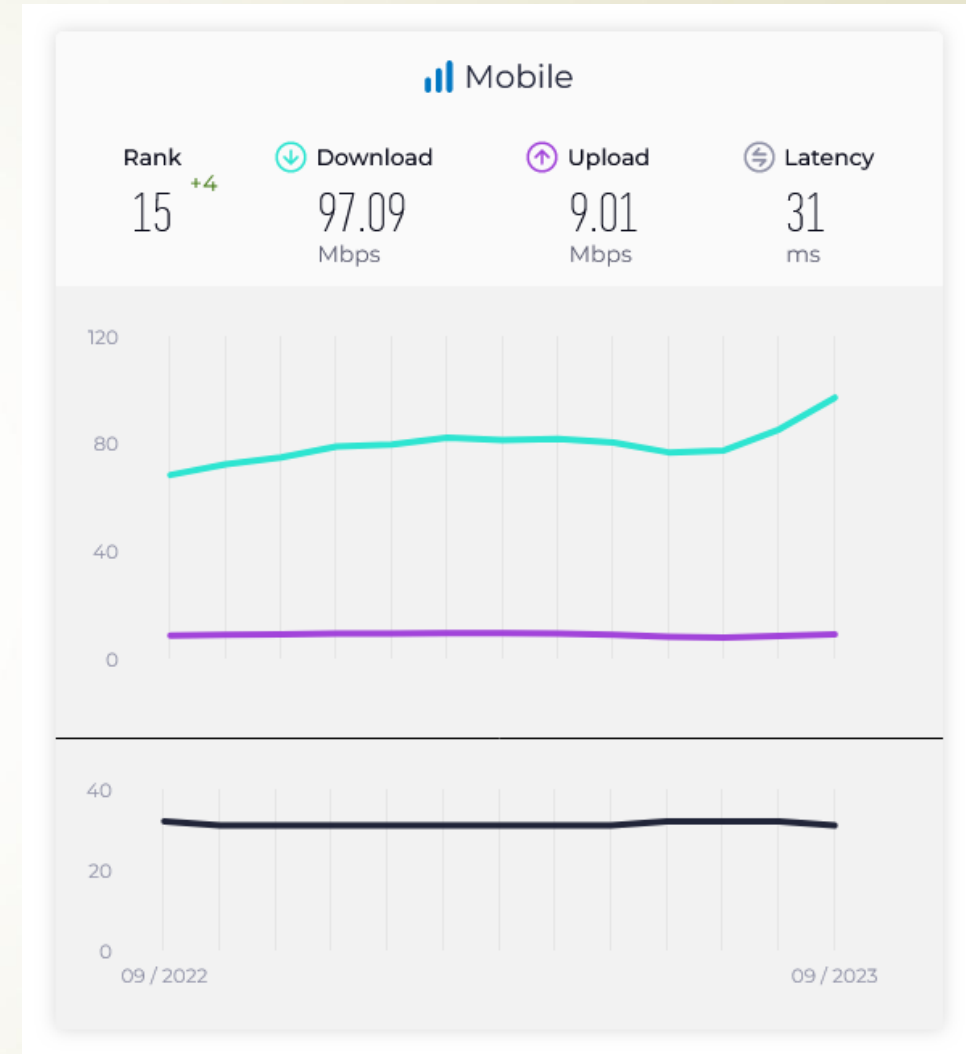
Image size vs. file size

- JPG @ 75 Quality

  - 753K (2400 x 2400 px)

  - 220K (1200 x 1200 px)

  - 57K (600 x 600 px)

- File size roughly proportional to the number of pixels

View File Size

- Firefox

- Ctrl-I

- Media

Simple Strategies

- Less complicated, graphical layouts

- Fewer, smaller images

- Size images correctly

- Optimal image formats

  - **JPG** – Photos, images with many colors (*Lossy*)

  - **PNG-8** – Graphics, <256 colors (*Lossless*)

  - **PNG-24 –** Alpha Transparency (*Lossless*)

Optimize w/Online Tools

- **Squoosh**

- **Compress-or-die**

- **Tinypng**
  - Analyzer
  - Web files

- **Examples**

Next Gen Formats

- **WebP**
- **SVG**
- **AVIF**

Can I Use Webp?

- caniuse.com/webp
- Safari since 2022
- See video!

Can I Use AVIF?

- caniuse.com/?search=avif

- Firefox, Safari since 2023

Video

- Landing pages solution (e.g., home, etc.)
- Look at CSU home page – Got rid of background video
- www.colostate.edu
- Now has play button
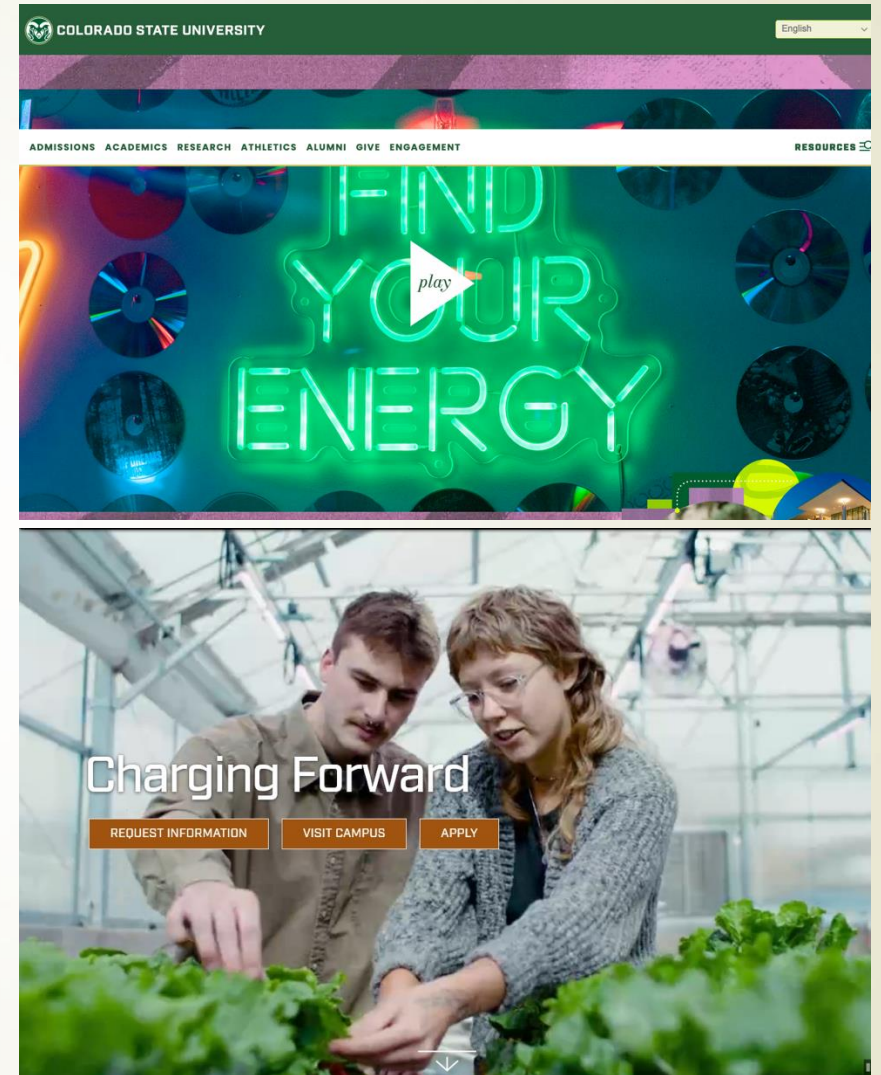
More Techniques

- Optimize web fonts - see article - example goldhillinn.com
- **Use current version of Google Fonts!**
- Solid colors/small tiling images as part of design – Exercise #4
- No or little text as images
- Reuse images - browser cache
- Linked CSS (and javascript)
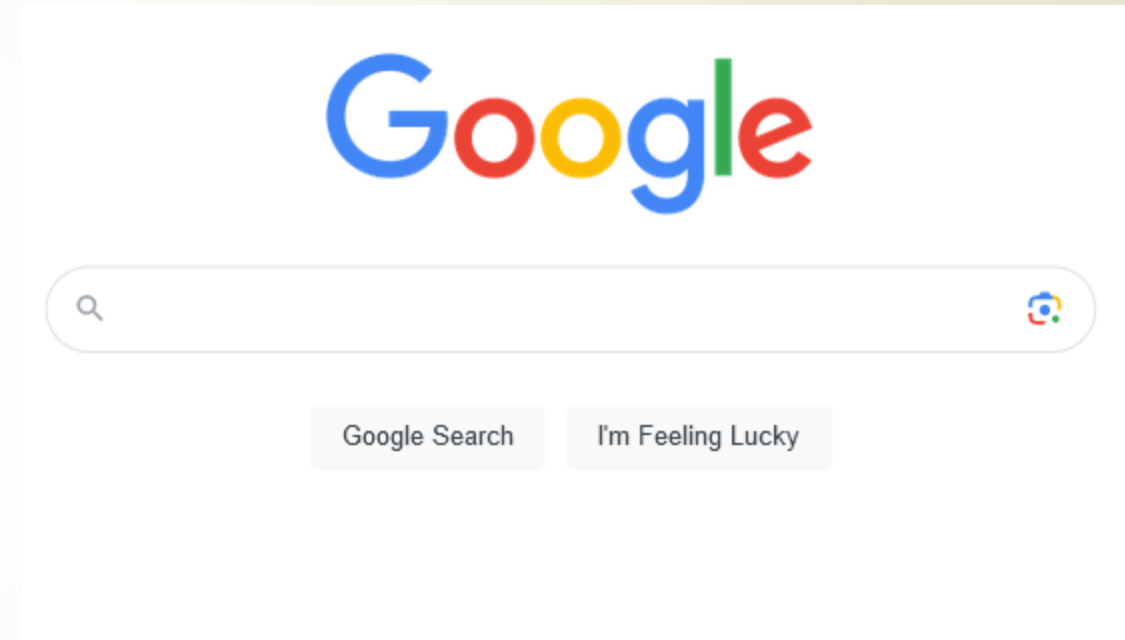- Minify code - example fontawesome.css
- Examples…

More Complex Strategies

- Case by case basis

- Lots of server-side stuff

- See me in lab is this is something that interests you

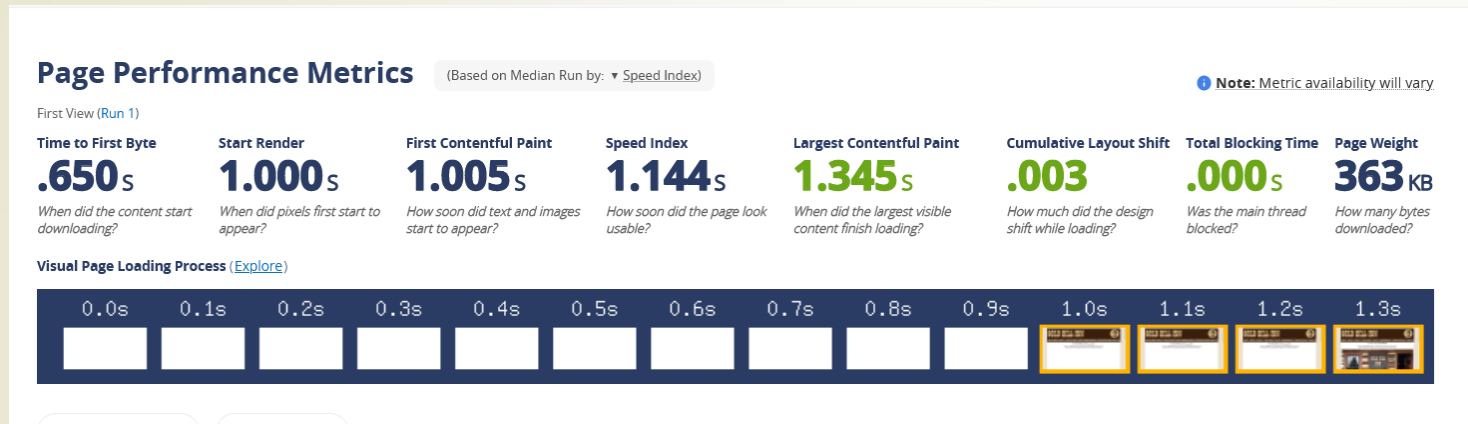# Search Engine Signal

- Site speed can impact search engine results
- Full lecture coming

Measurement - WebPageTest

- www.webpagetest.org

- Have to create account

- **Speed Index** -

  - Measures how quickly the content is visually displayed

  - Lower is better

Measurement

- Google PageSpeed Insights

- developers.google.com/speed/pagespee
d/insights/

- Mobile - Simulated 4g connection –
1.6M

- Desktop - Cable connection 10M

- Might have to run a few times

- 0 - 3.4s is acceptable

- Field data
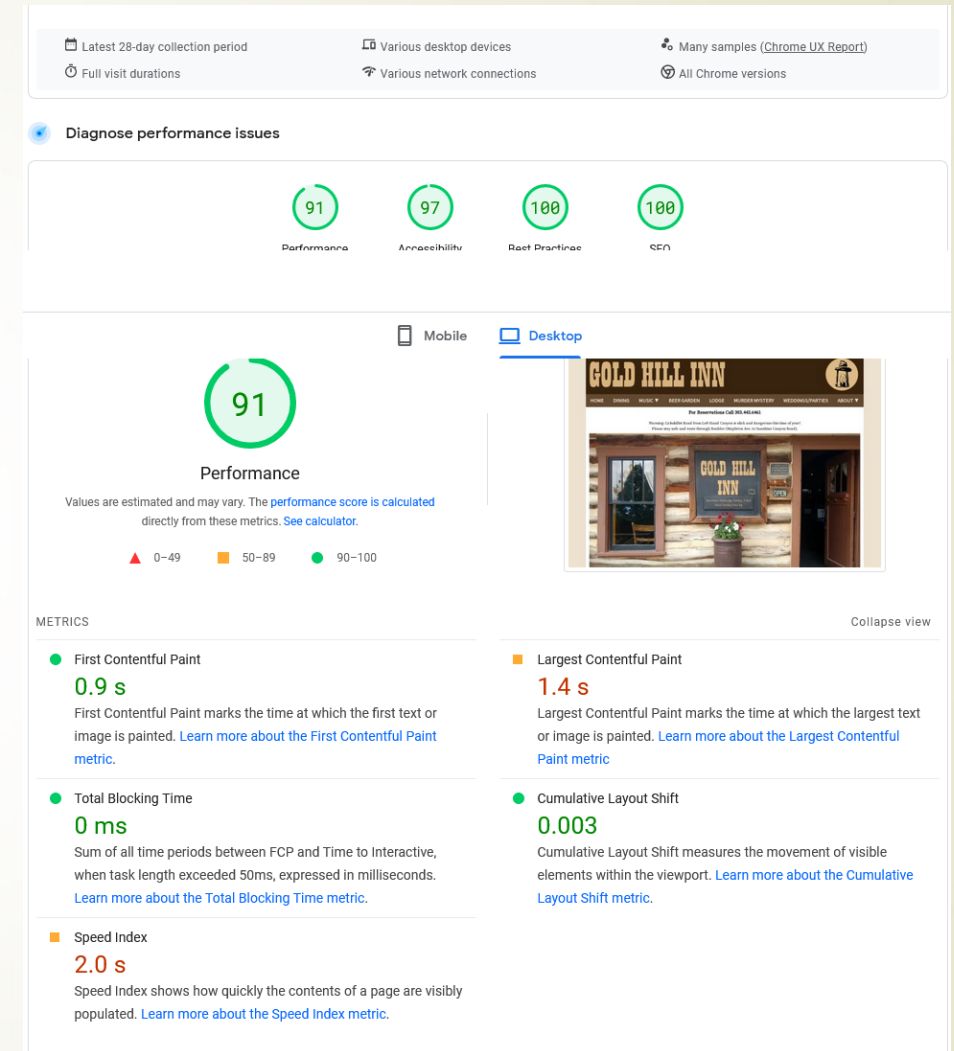
Measurement

- Google PageSpeed Insights

- Field data

- Unrealistic simulation speeds?

  - Mobile - Simulated 4g connection – 1.6M

  - Desktop - Cable connection 10M

Google Mobile Guidelines

- Google now recommending 3 second Speed Index time/500k maximum page size

- www.thinkwithgoogle.com/marketing-strategies/app-and-mobile/mobile-page-speed-new-industry-benchmarks/

Speed:
Average Speed Index
How quickly the mobile page displays content to users (lower is better).

Best Practice: Under 3 seconds
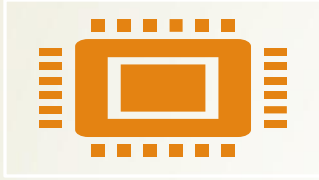
Weight:
Average Page Weight Bytes
The total size of a mobile webpage, measured in bytes (lower is better).

Best Practice: Less Than 500KB

For Project

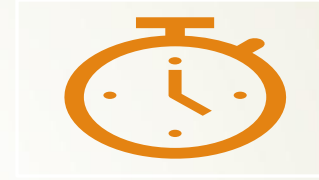**Page Speed Insights or WebPageTest**

Desktop/cable connection

developers.google.com/speed/pagespeed/
insights/

www.webpagetest.org

Images sized correctly, optimized –
w/tinypng Analyzer, Firefox image size

Speed Index <= 3.4 seconds

Or less than 500k total page size

**For superior project : Mobile speed index
<= 3.4 seconds on PageSpeed Insights
(This is the recommendation)**