# Web Performance

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# What is Web Performance?

- How fast is a website
  - Consider desktop, tablet, mobile

- Multiple factors
  - Page speed - driven by the application's architecture and code
  - Network connection
  - Infrastructure

2019

# Importance of Web Performance

- User retention
- Engagement
- Sales

- In 2017 2G was still the most used network
- Can't assume 4G/LTE/5G availability
- Can't assume "latest phone" usage

2019

# Changes

- Web usage moved from wired, desktop machines to
- Unreliable, mobile connections

2019

# Importance of Web Performance

- Pinterest: 40% reducement in perceived wait time, 15% more signups
- COOK: reduced page load by 850 ms, 7% conversion increase
- BBC: Lost 10% of users for every additional second the site took to load
- DoubleClick: 53% of mobile users left if a page took more than 3s to load

# Importance of Web Performance

| User Perception Of Performance Delays | |
|---|---|
| 0 to 16ms | Users are exceptionally good at tracking motion, and they dislike it when animations aren't smooth. They perceive animations as smooth so long as 60 new frames are rendered every second. That's 16ms per frame, including the time it takes for the browser to paint the new frame to the screen, leaving an app about 10ms to produce a frame. |
| 0 to 100ms | Respond to user actions within this time window and users feel like the result is immediate. Any longer, and the connection between action and reaction is broken. |
| 100 to 300ms | Users experience a slight perceptible delay. |
| 300 to 1000ms | Within this window, things feel part of a natural and continuous progression of tasks. For most users on the web, loading pages or changing views represents a task. |
| 1000ms or more | Beyond 1000 milliseconds (1 second), users lose focus on the task they are performing. |
| 10000ms or more | Beyond 10000 milliseconds (10 seconds), users are frustrated and are likely to abandon tasks. They may or may not come back later. |

As seen on https://developers.google.com/web/fundamentals/performance/rail

2019

# Developing countries

- Sub-Saharan Africa is projected to have 500 million mobile users by 2020

- At the end of 2016 there were 420 million (43% of the population)

- LTE only introduced in some countries in 2017 for 90 million active mobile internet subscriptions

# Iterative process

Test

Record

Measure

# Ultimate goal

- Providing great user experience regardless of device and network
- A site / app that performs well under all conditions

# How?

- Backend
  - Enable compression
  - HTTP/2
  - Media management

- Frontend
  - Lazy loading
  - Minification
  - Preload