ROLLING SCOPES FRONTEND COURSE

Brest, 2016

Aliaksandr Orgish

Rolling Scopes Community

http://rollingscopes.com http://brest.rollingscopes.com

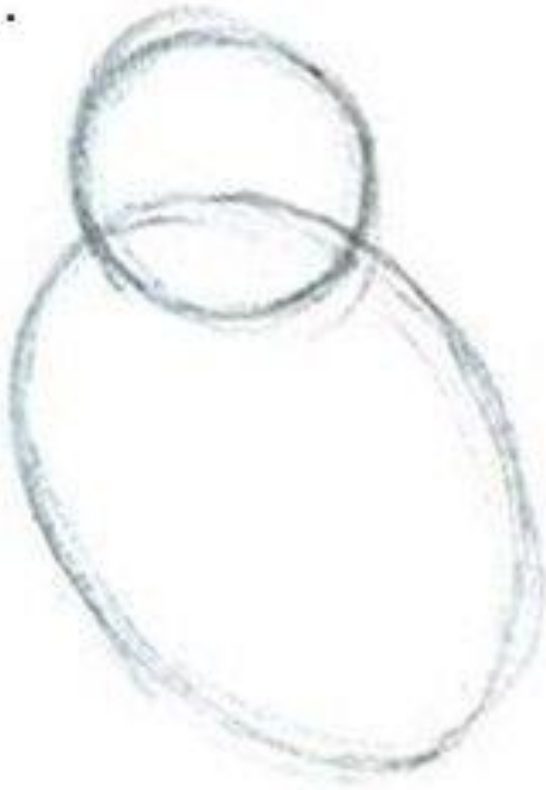
Slack chat invites: http://brest-rolling-scopes.azurewebsites.net

Plan

- Introduction. How browsers work
- HTTP
- Introduction to HTML5 / CSS3
- Introduction to Javascript 2015
- Introduction to Functional Programming
- Unit testing and Continuous Integration
- Nodejs, Express
- Developers Tools
- Introduction to REST
- Web apps architecture
- Introduction to JS Frameworks (Angular / React)

How to draw an owl

1.

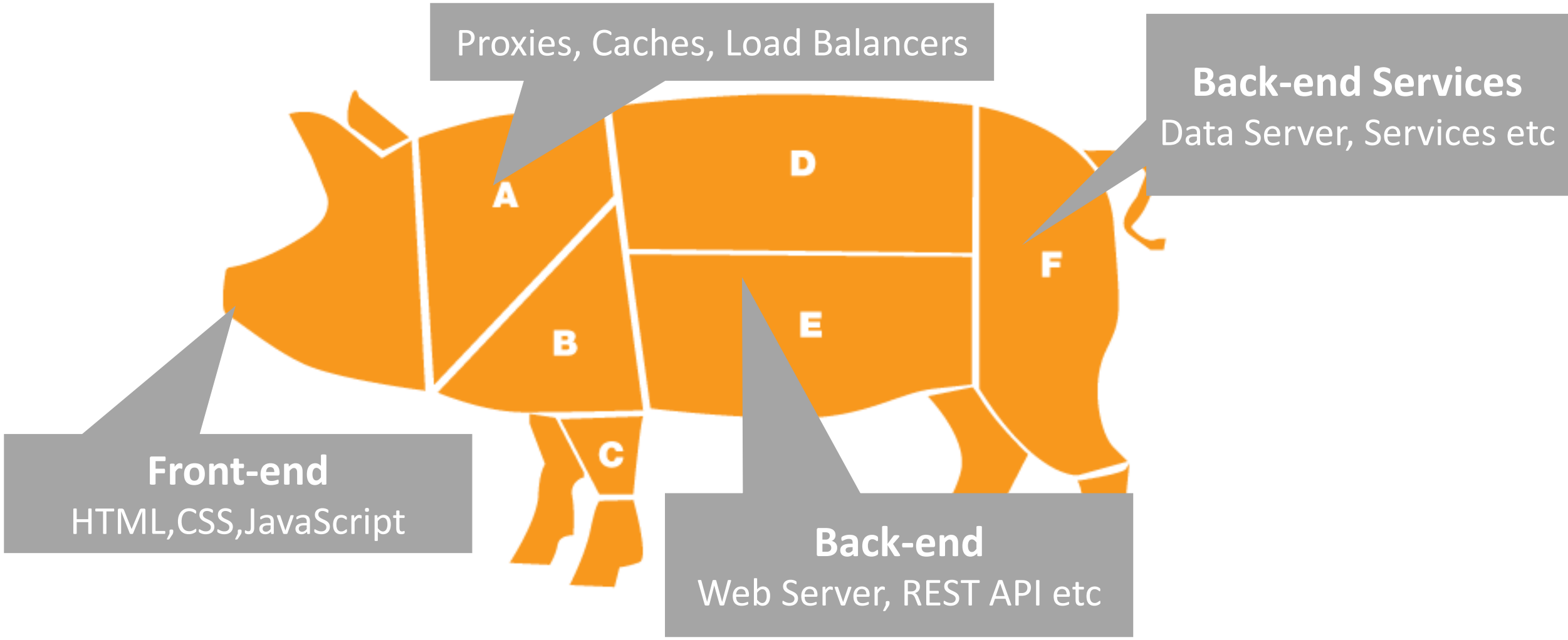


2.

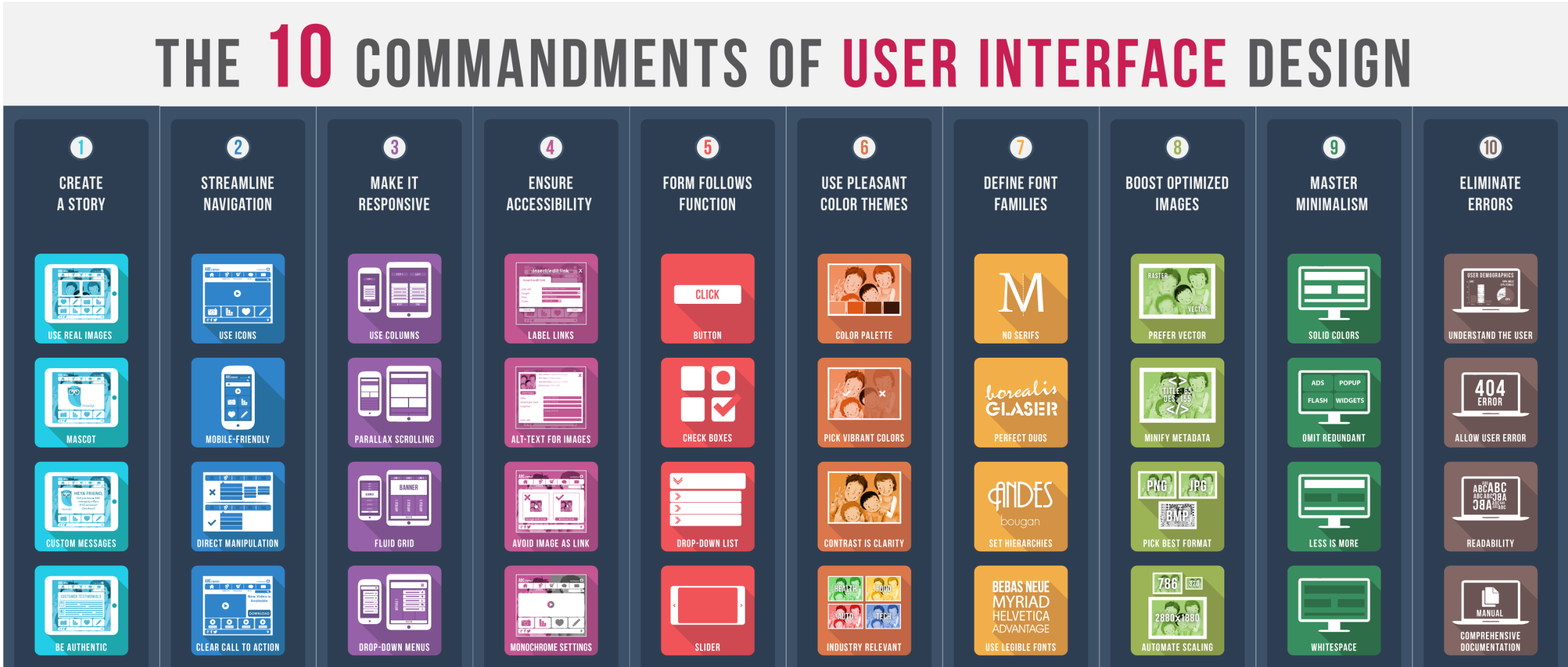
1. Draw some circles

2. Draw the rest of the fucking owl

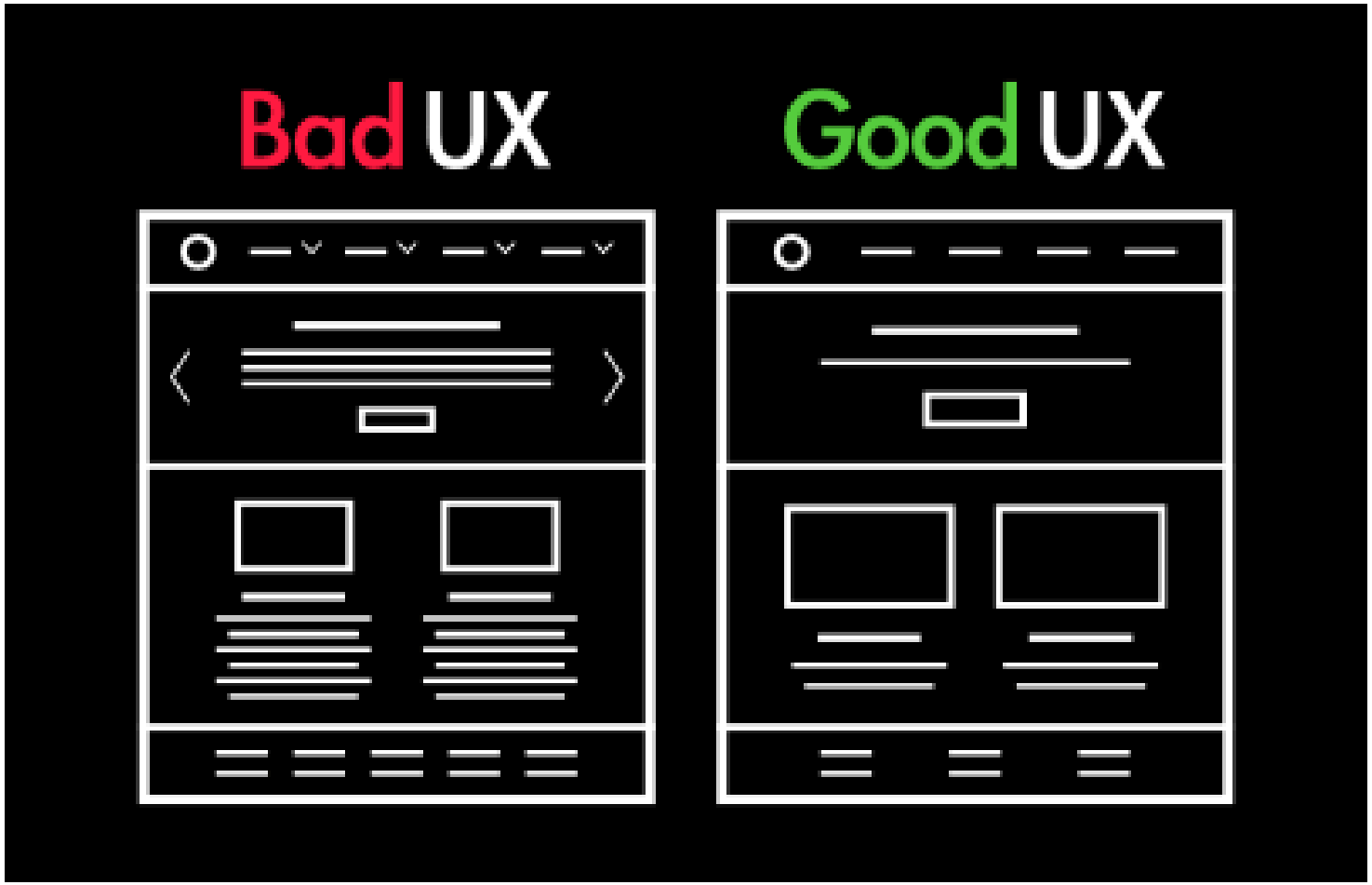
Web app infrastructure



Frontend Specialization : Web Designer



Frontend Specialization : UX Designer



https://www.youtube.com/watch?v=Ovj4hFxko7c

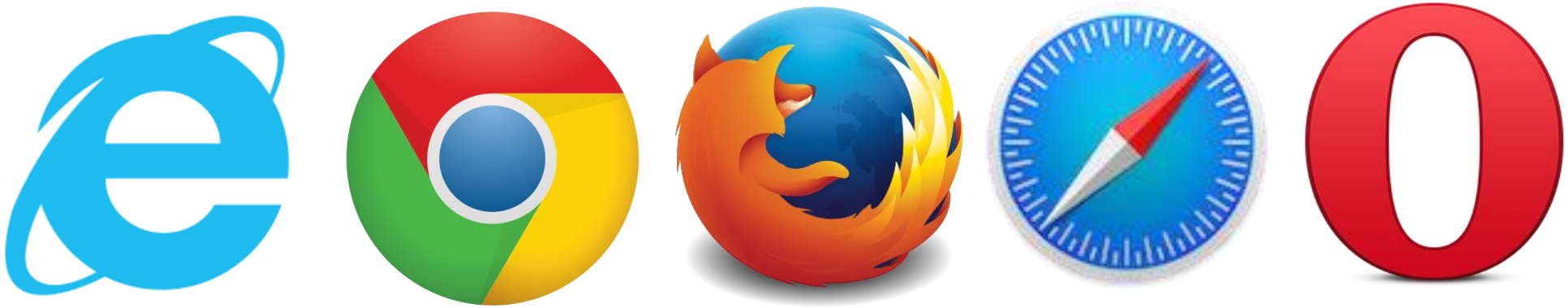
Frontend Specialization : Web Developer

What is Frontend

Frontend Tools

User agent (desktop)

57% 25% 12% 5% 1%



http://www.netmarketshare.com/

User agent (mobile + tablet)

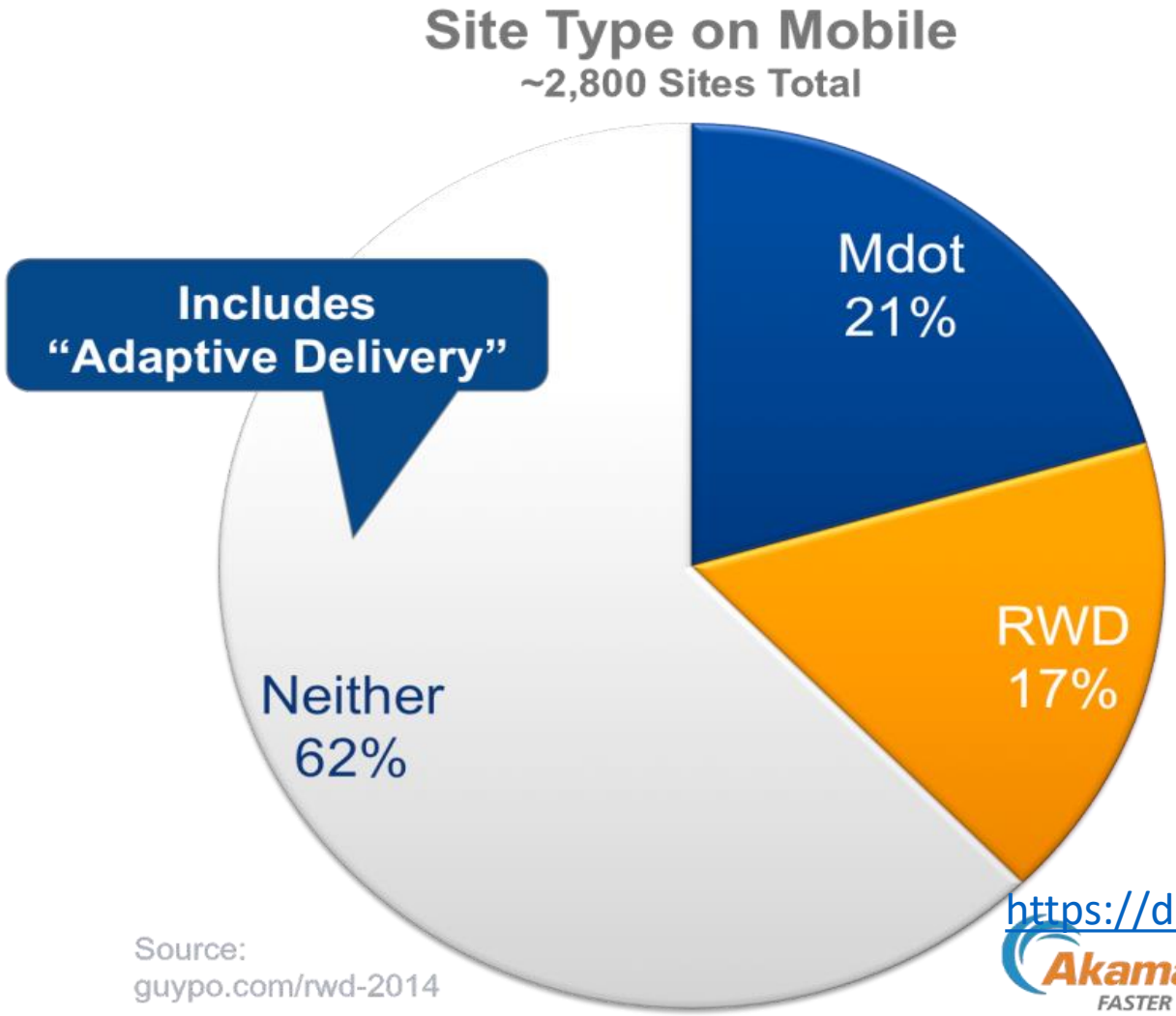
41%

34%

11%

http://www.netmarketshare.com/

Mdot vs adaptive vs RWD



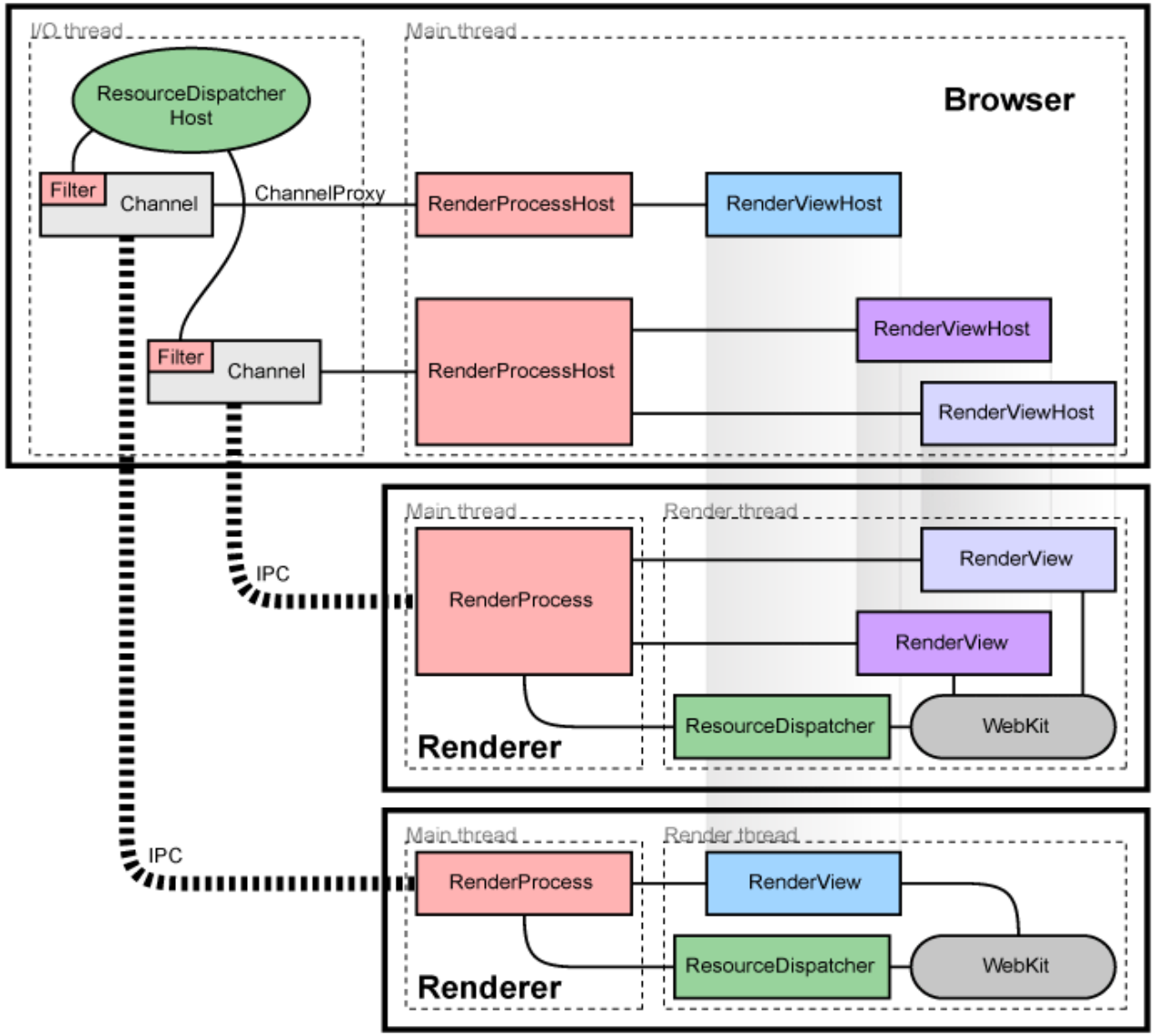
Responsive Web Design Adoption, 2014

https://developers.google.com/webmasters/mobile-sites/mobile-seo/

Akamai
FASTER FORWARD

Responsive design versus adaptive design

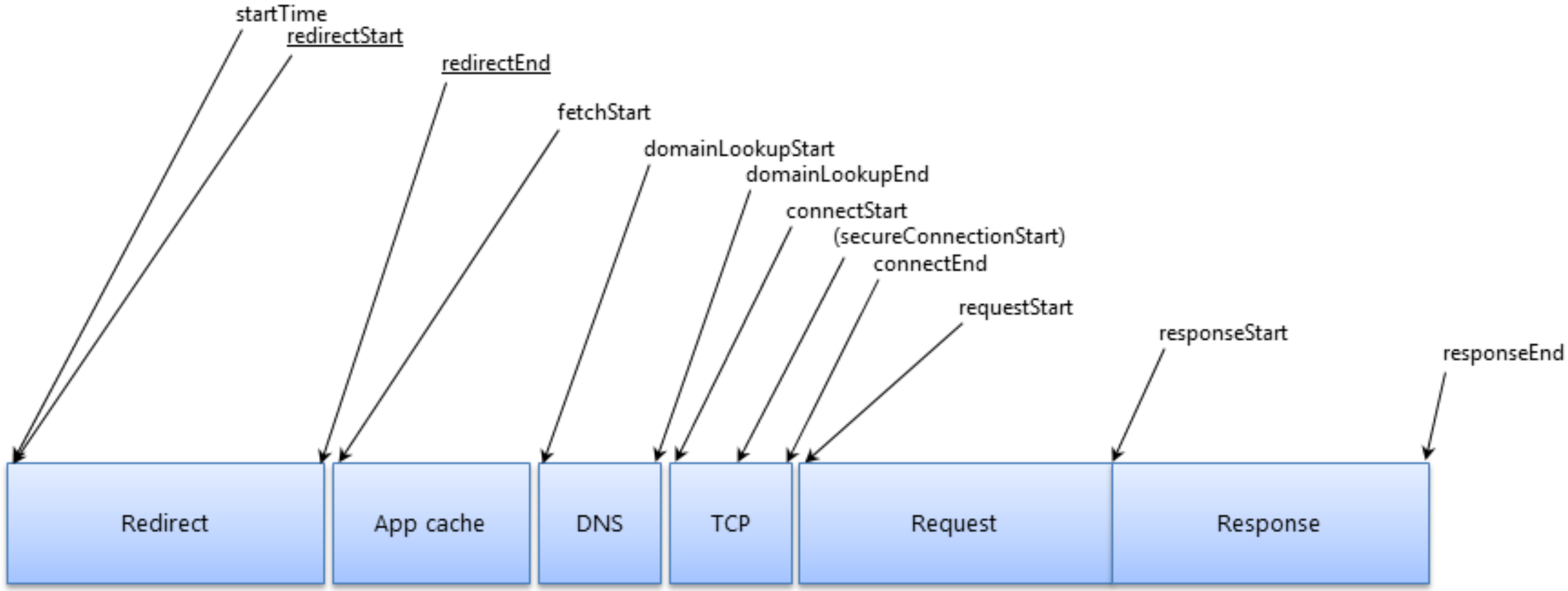
High level browser architecture



[Multi Process Architecture]

[Mozilla Electrolysis]

Networking


startTime
redirectStart
redirectEnd
fetchStart
domainLookupStart
domainLookupEnd
connectStart
(secureConnectionStart)
connectEnd
requestStart
responseStart
responseEnd
Redirect
App cache
DNS
TCP
Request
Response

RESPONSE TIME LIMITS

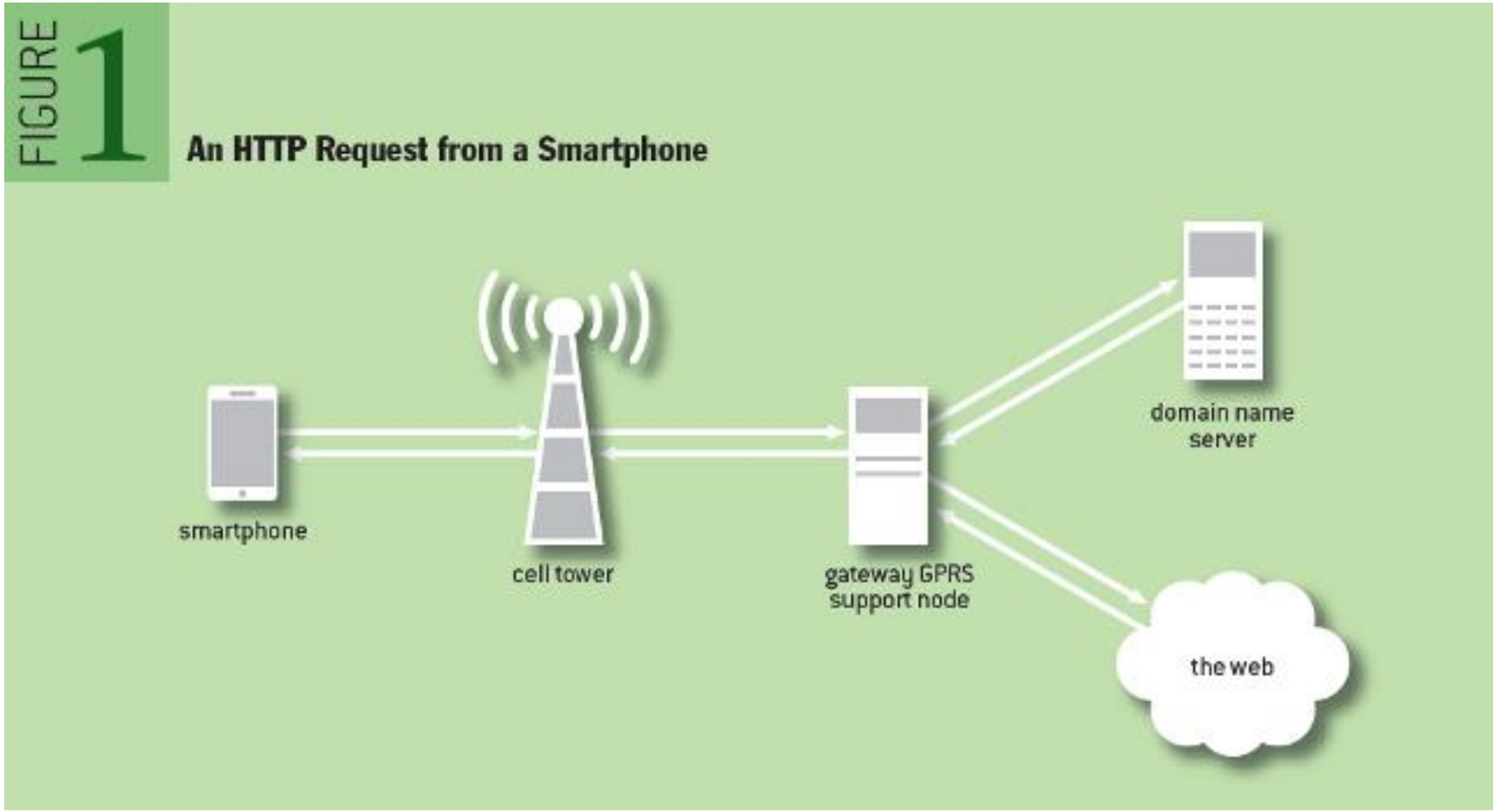
Every 10 seconds, 5500 hot dogs eaten in America.

Website Response Times

Network latency

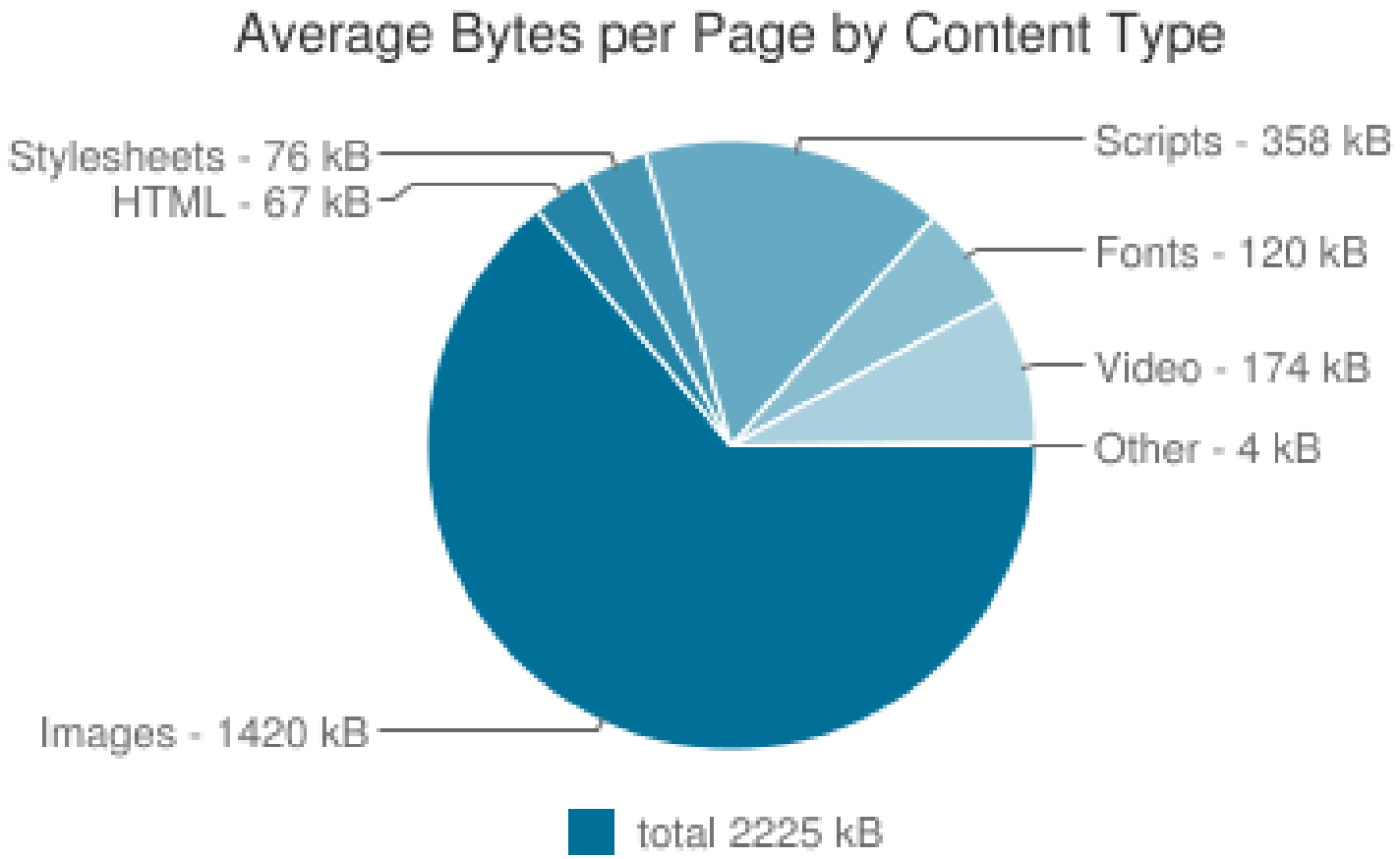
Route	Distance, km	Light in Vacuum, ms	Light in Fiber, ms	RTT in Fiber, ms
MINSK – LONDON	2,162	7	11	22
MINSK – NEW YORK	7,118	24	36	72
MINSK – SYDNEY	15,131	51	76	152
EQUATORIAL CIRCUMFERENCE	40,075	133.7	200	200

3G Mobile Network



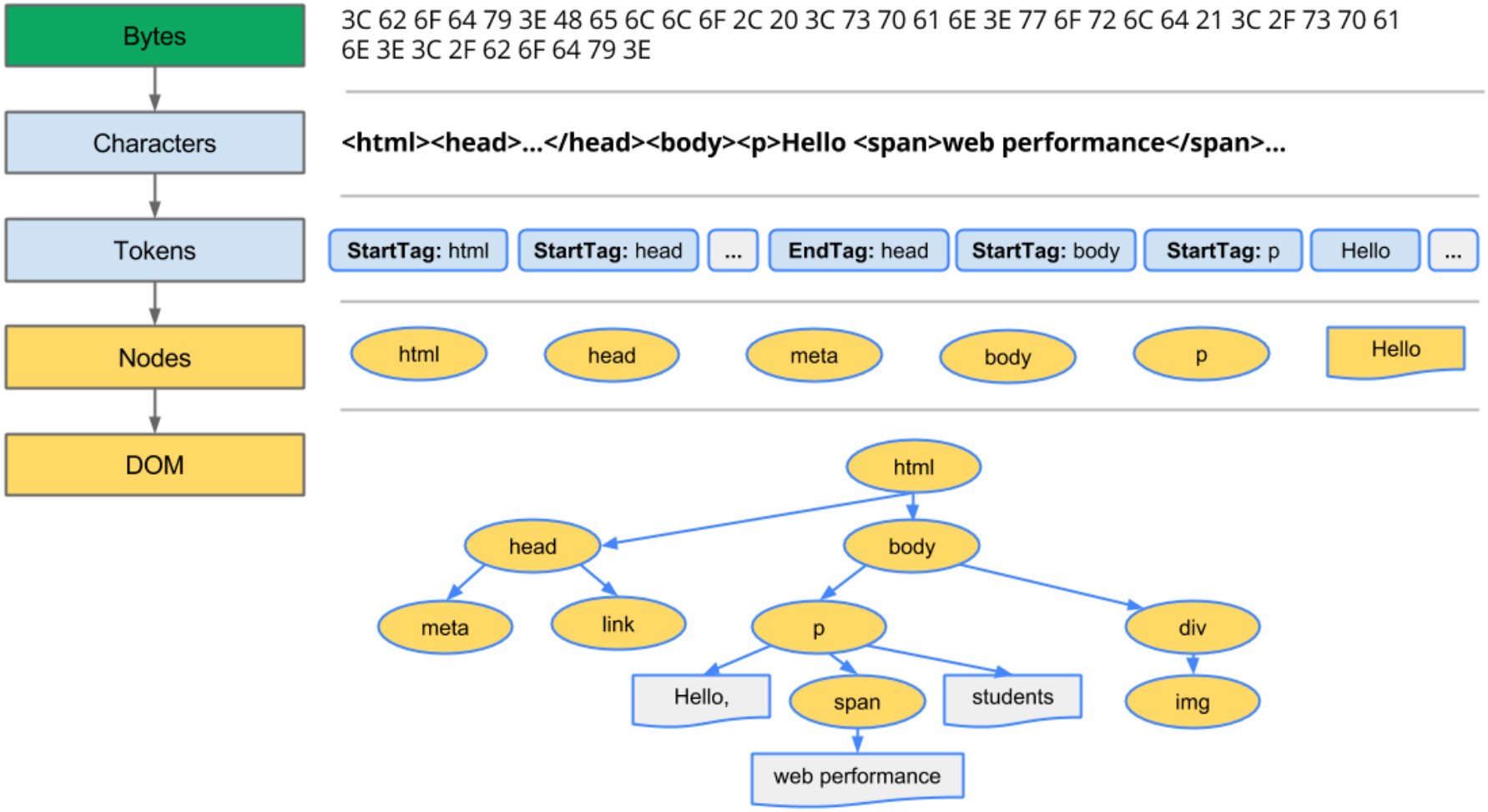
The Evolution of Web Development for Mobile Devices

Http archive : modern trend & stats



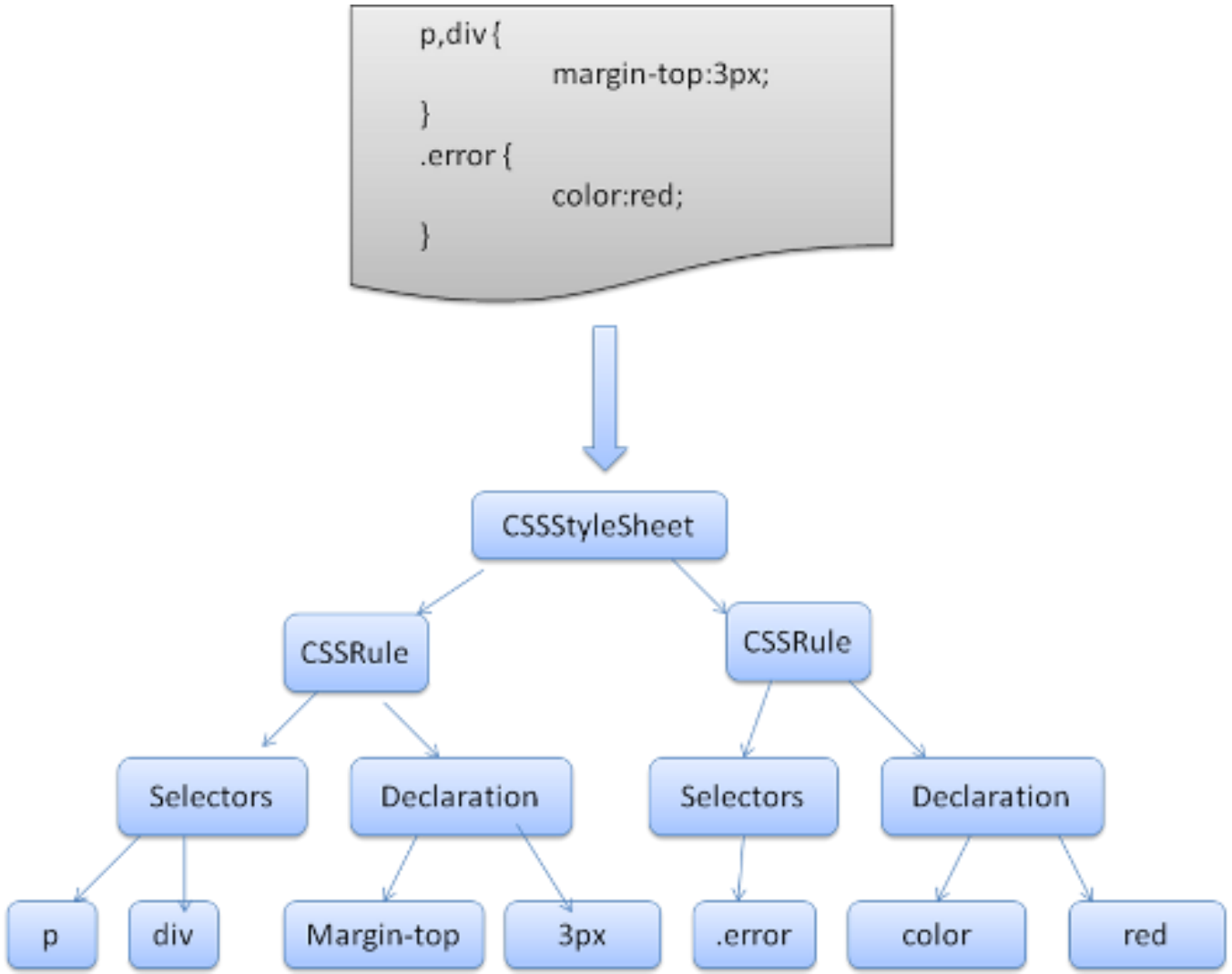
http://httparchive.org/
http://mobile.httparchive.org/

HTML parsing - DOM



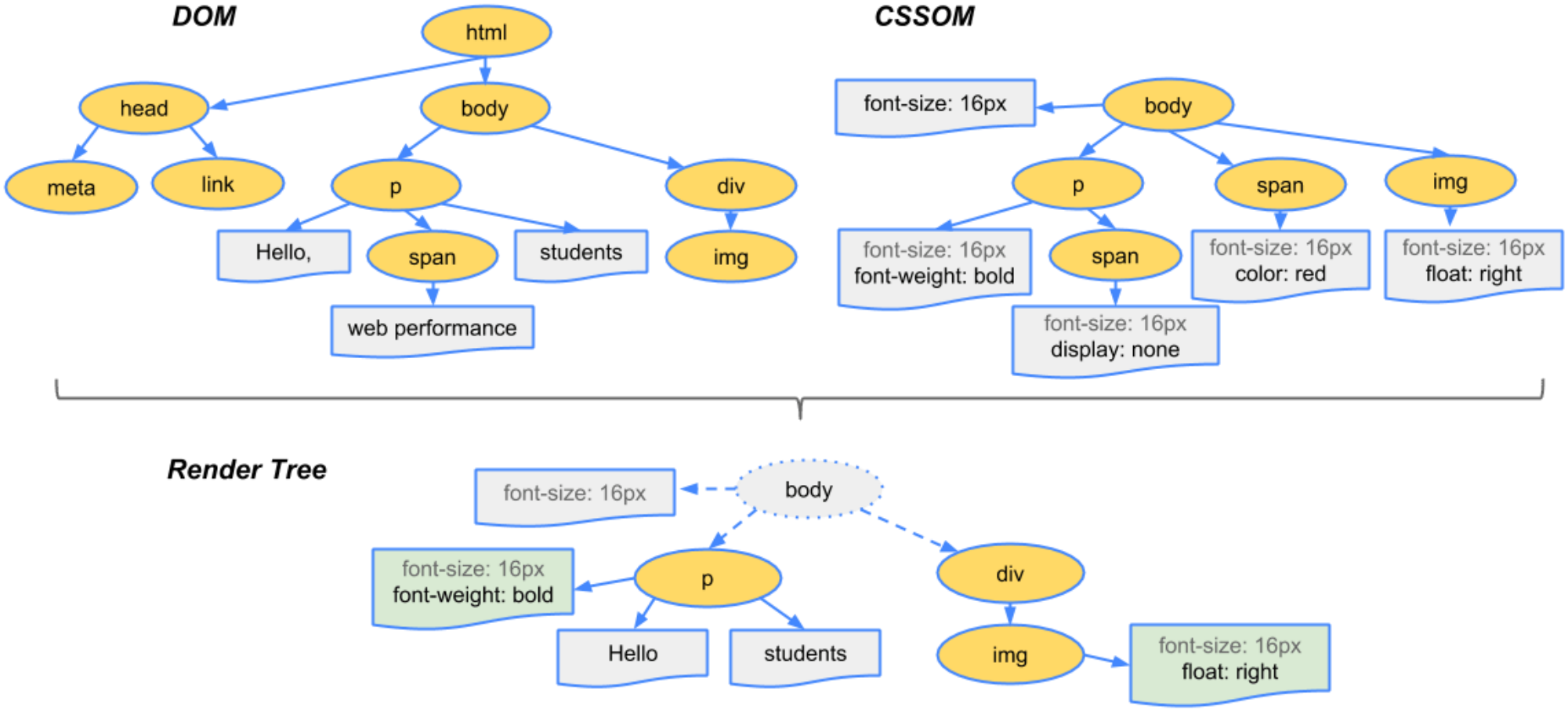
[HTML5 - Parsing HTML documents]

CSS Parsing - CSSOM

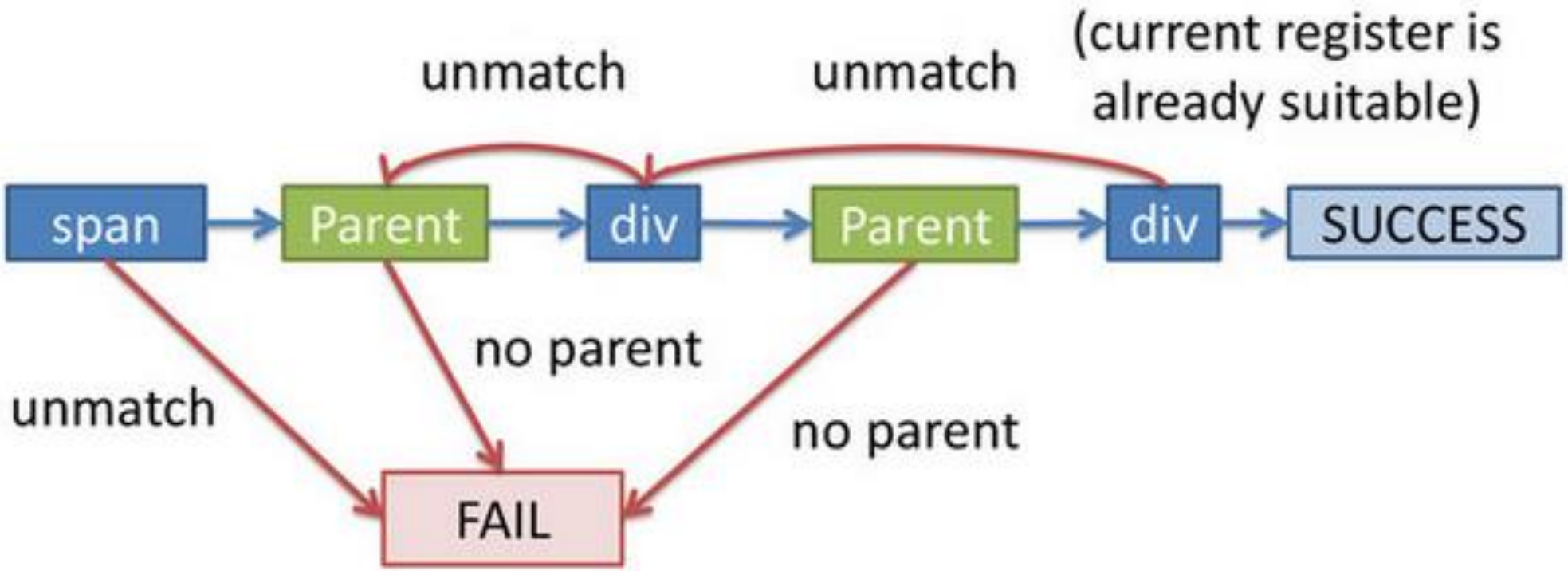


[CSS Syntax Module Level 3]
[CSS Object Model (CSSOM)]

Render tree

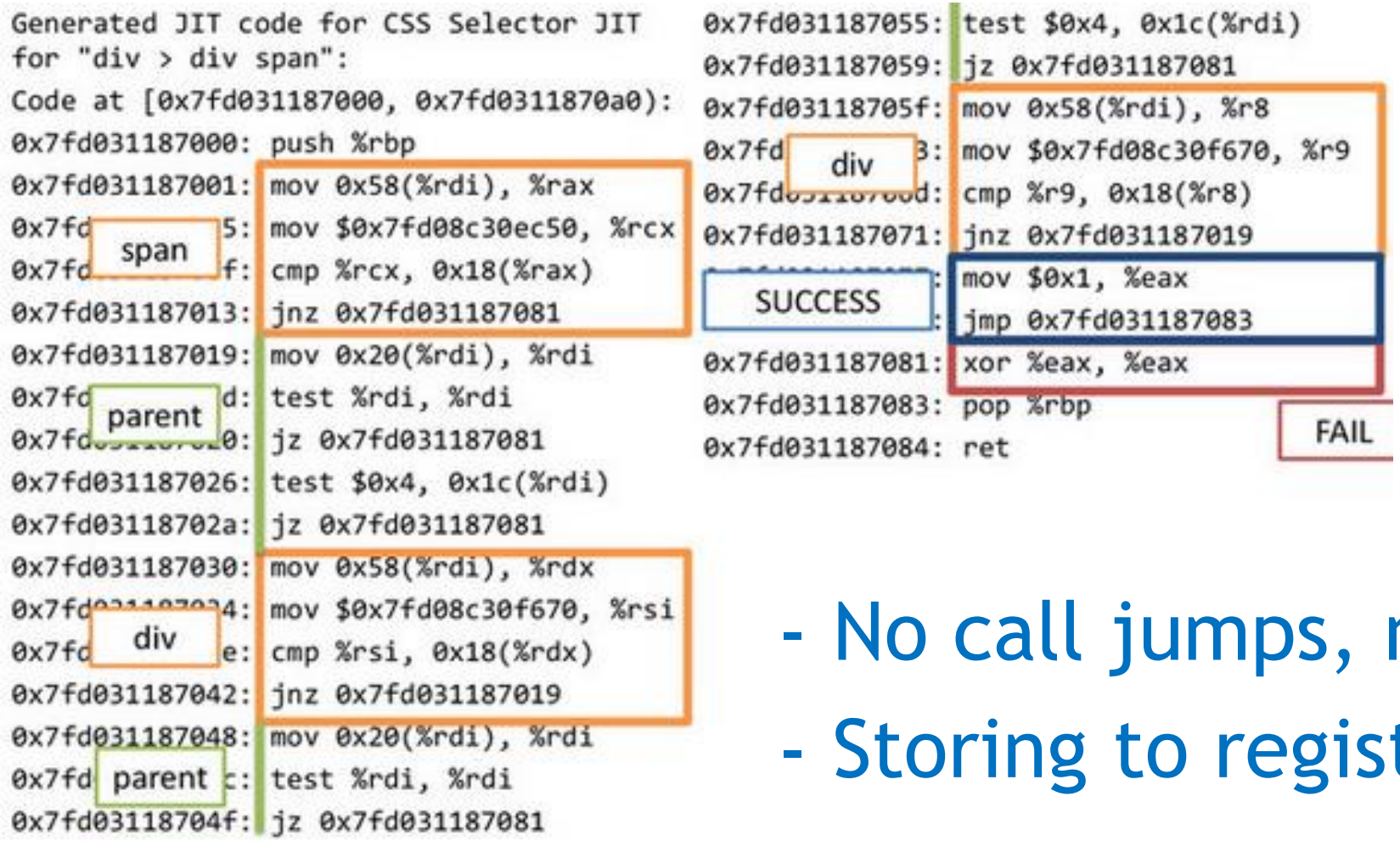

DOM
html
head
body
meta
link
p
div
Hello,
span
students
img
web performance
CSSOM
font-size: 16px
body
p
span
img
font-size: 16px
font-weight: bold
span
font-size: 16px
color: red
font-size: 16px
float: right
font-size: 16px
display: none
Render Tree
font-size: 16px
body
font-size: 16px
font-weight: bold
p
div
Hello
students
img
font-size: 16px
float: right

CSS Selector : div > div span



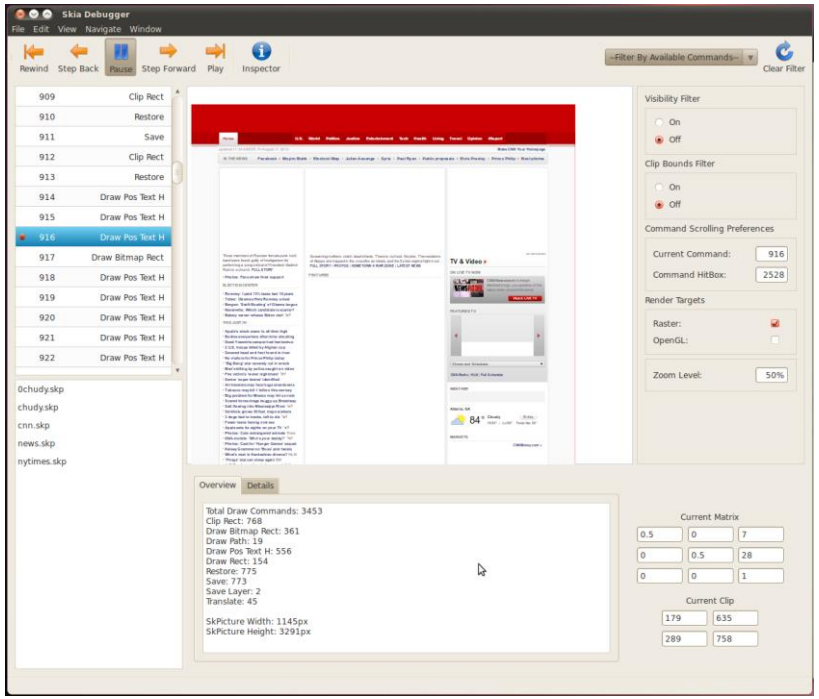
[Little overview of WebKit's CSS JIT Compiler]
[WebKit CSS JIT Internals]

JIT Code : div > div span



- No call jumps, no recursions
- Storing to registers only

Browser Graphics



An open source 2D graphics library which provides common APIs that work across a variety of hardware and software platforms. It serves as the graphics engine for Google Chrome and Chrome OS, Android, Mozilla Firefox and Firefox OS, and many other products.

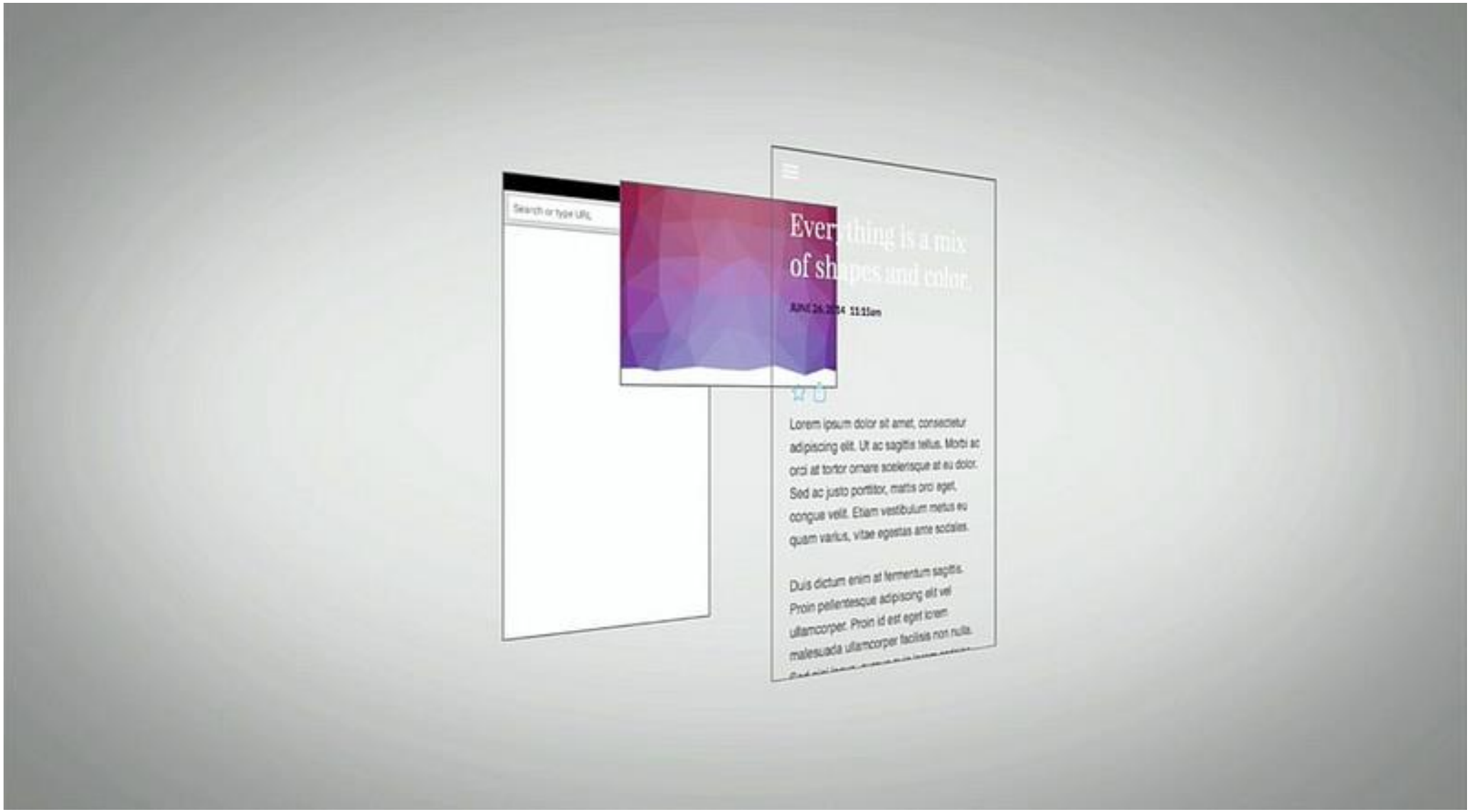
[SKIA]

[Skia Debugger]

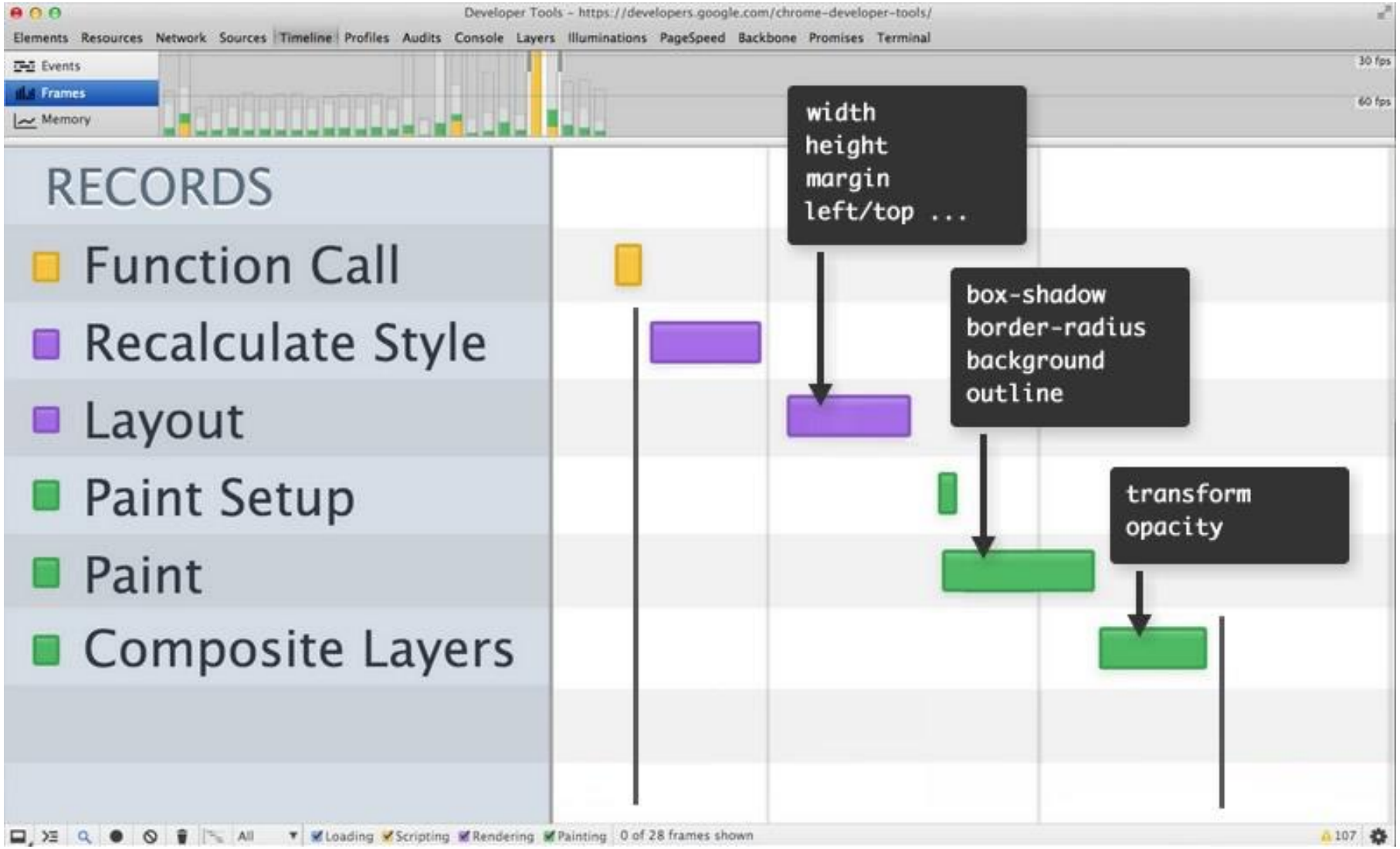
[CSS Paint Times and Page Render Weight]

Page layout (video)

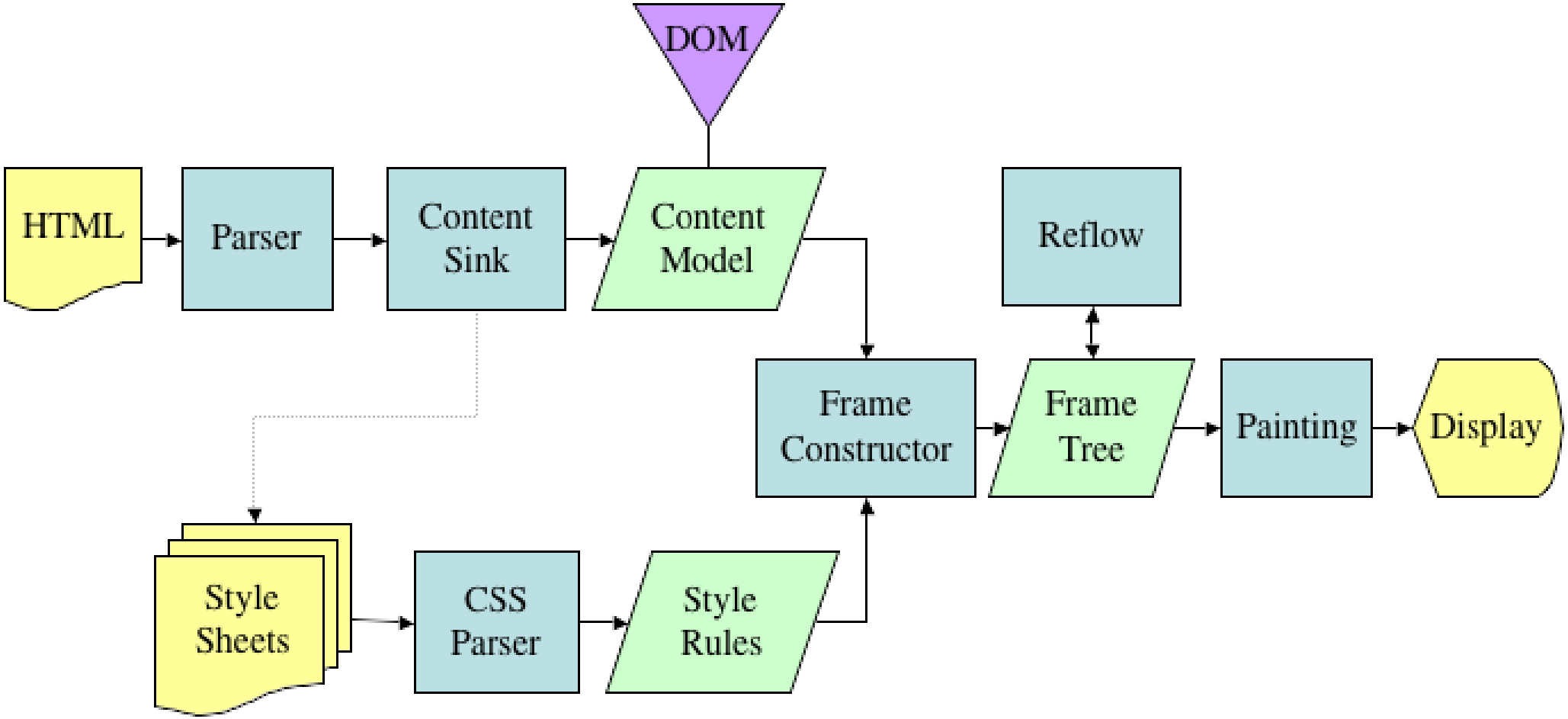
Composing layers



Reflow & Repaint



Render Page Summary



[Introduction to Layout in Mozilla]

JS Engines

V8 Crankshaft

- V8 JavaScript Engine
- Crazy Russian compiler engineer that talks.

Spider Monkey

- Mozilla SpiderMonkey

Chakra

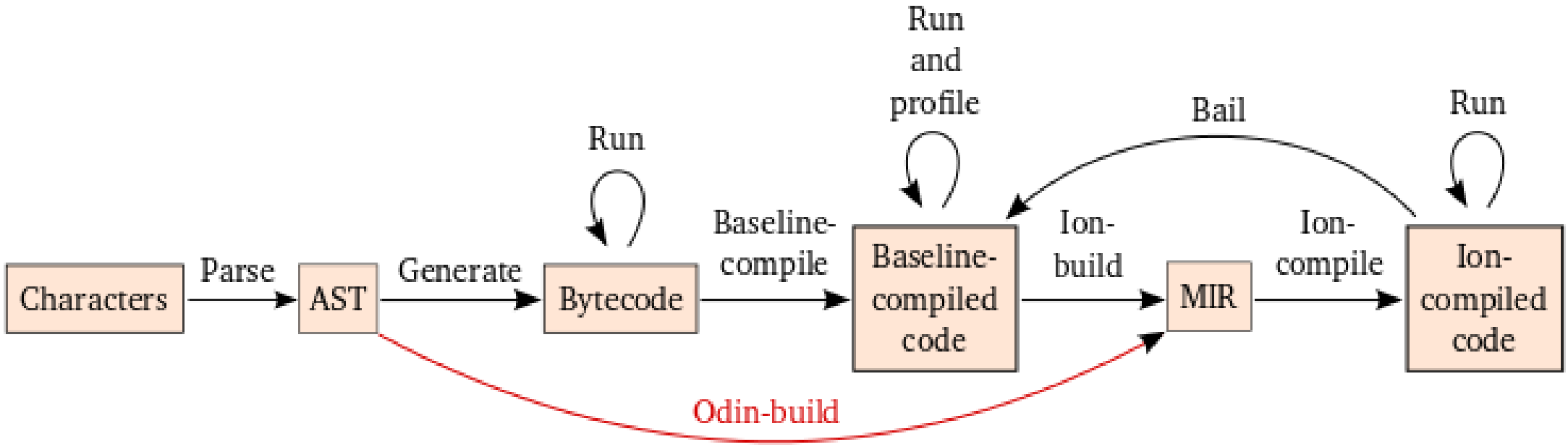
- Architecture Overview

Nitro

- JavaScriptCore

Performance Comparison

Javascript JIT compilation



[v8: a tale of two compilers]

[asm.js AOT compilation and startup performance]

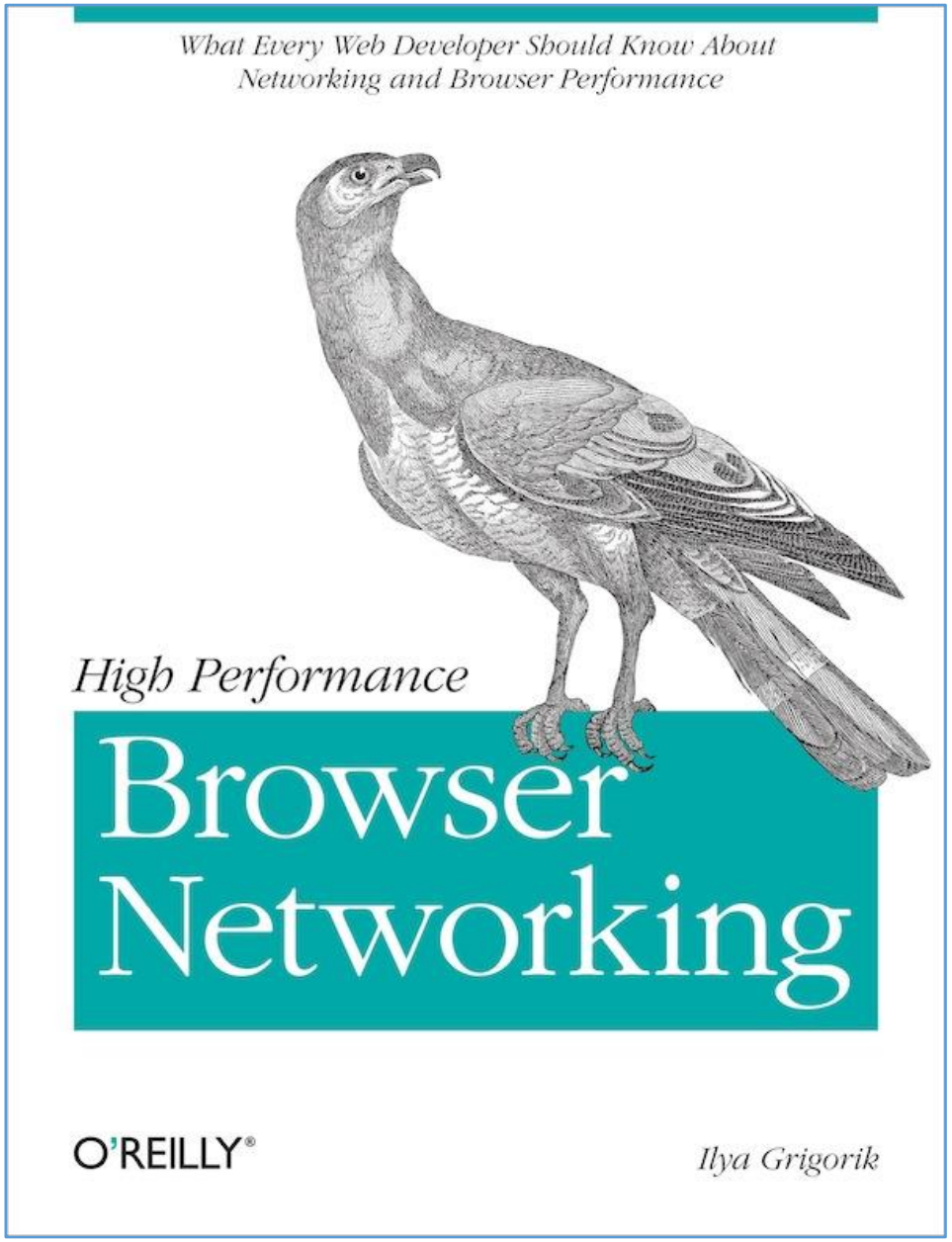
[Introducing the WebKit FTL JIT]

How to start learning frontend:

- https://developer.mozilla.org/en-US/Learn
- https://developers.google.com/web/
- http://docs.webplatform.org/wiki/Main_Page

- How browsers work:

http://www.html5rocks.com/en/tutorials/internals/howbrowserswork/

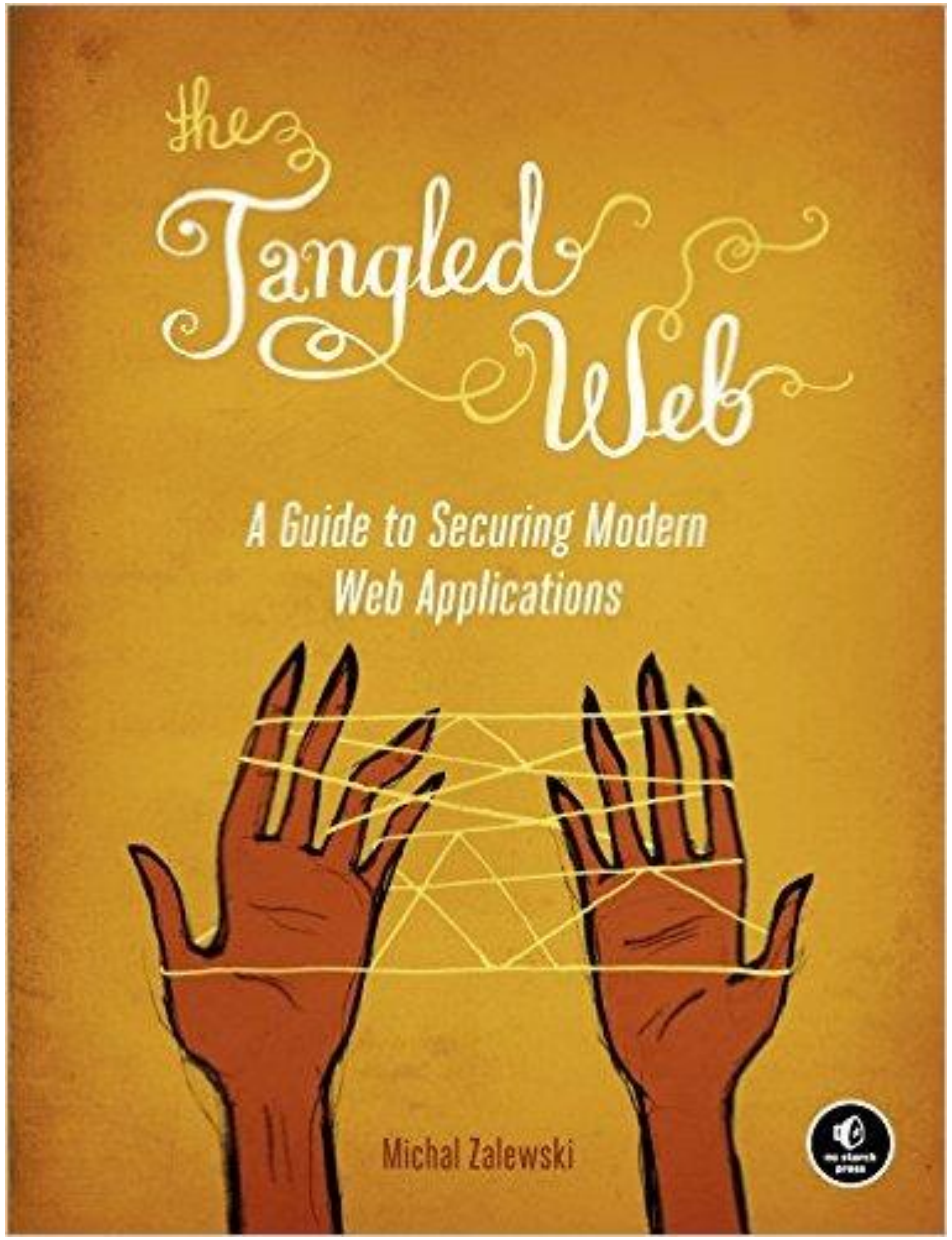


Ilya Grigorik

High Performance Browser Networking

http://chimera.labs.oreilly.com/books/1230000000545/index.html

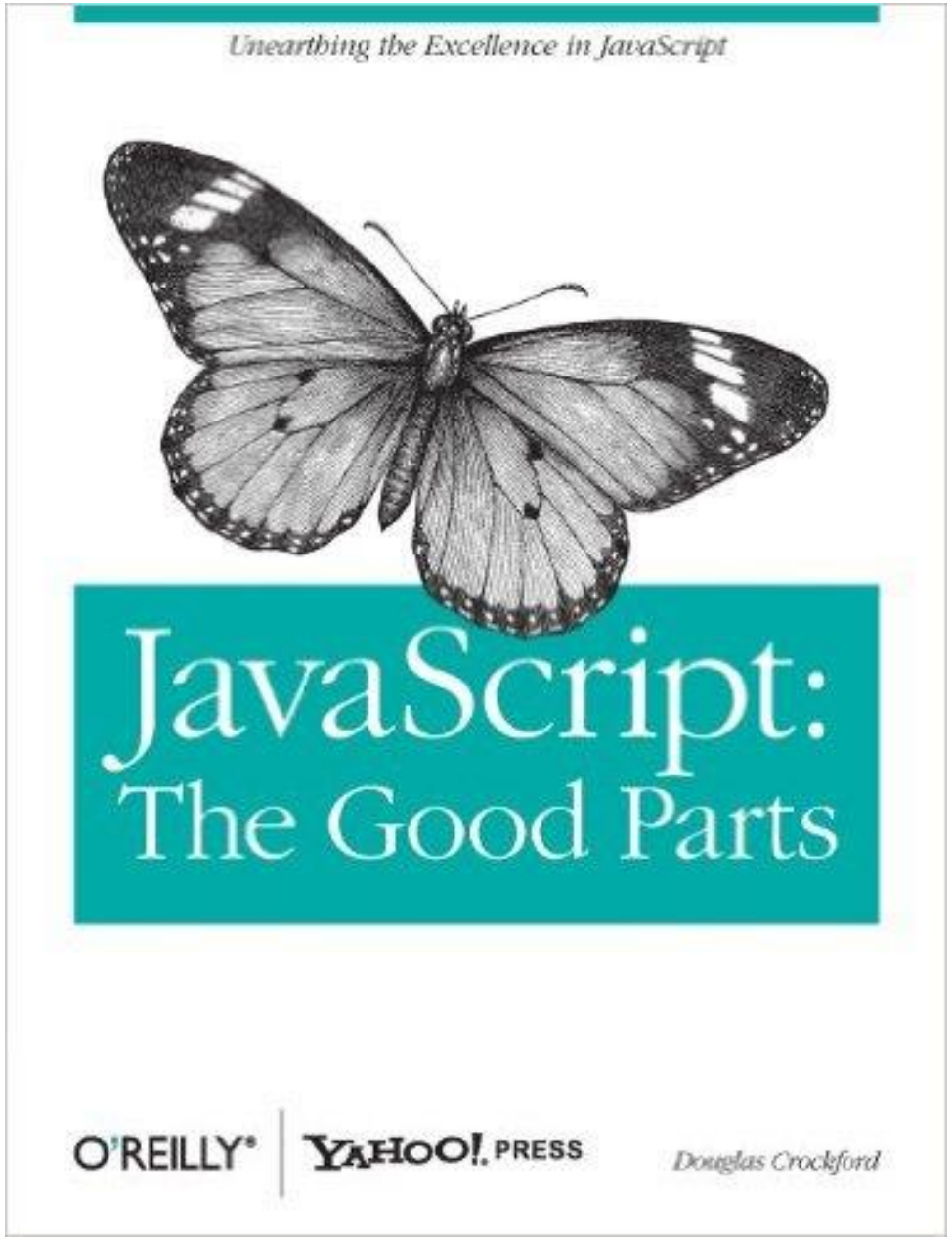
https://plus.google.com/+IlyaGrigorik



Michal Zalewski

The Tangled Web

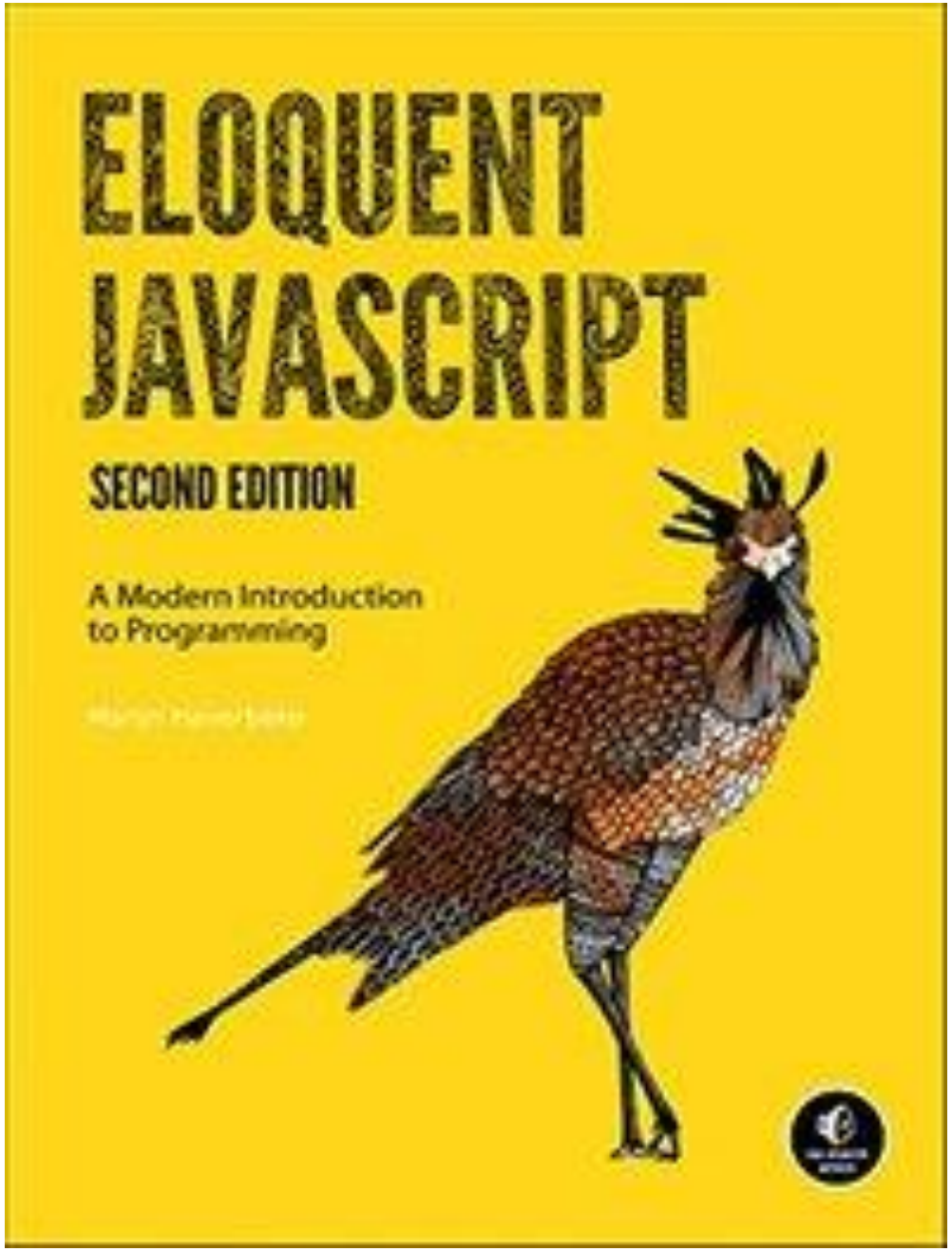
http://www.amazon.com/The-Tangled-Web-Securing-Applications/dp/1593273886



Douglas Crockford

JavaScript: The Good Parts

http://www.amazon.com/JavaScript-Good-Parts-Douglas-Crockford/dp/0596517742/

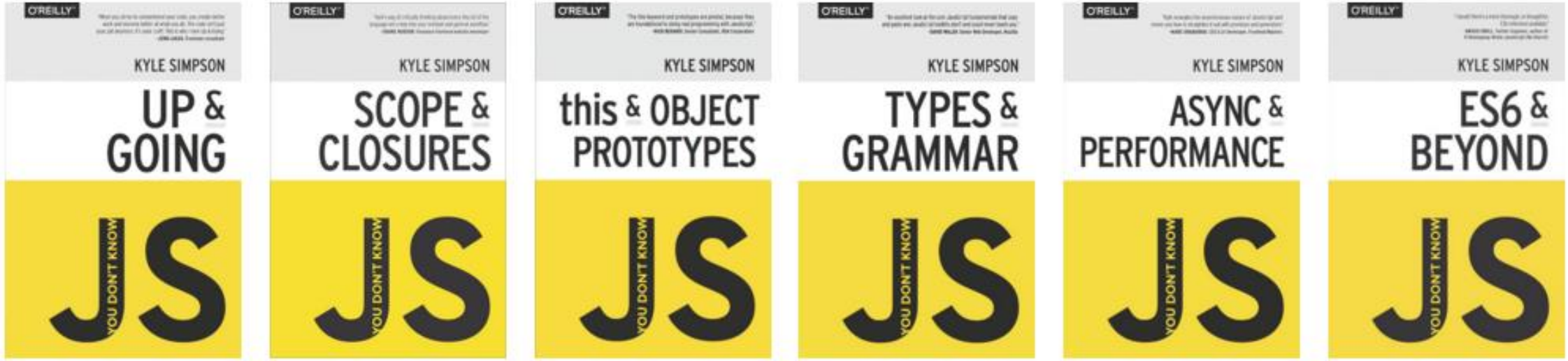


Marijn Haverbeke

Eloquent Javascript

http://www.amazon.com/Eloquent-JavaScript-Modern-Introduction-Programming/dp/1593275846/

https://karmazzin.gitbooks.io/eloquentjavascript_ru/



Kyle Simpson

You don’t known JS

https://github.com/getify/You-Dont-Know-JS

Frontend video courses

- https://academy.yandex.ru/events/shri/ekb-2013/
- https://academy.yandex.ru/events/shri
- https://park.mail.ru/materials/video/#9
- https://frontendmasters.com/ (commercial)
- https://www.youtube.com/playlist?list=PLEzQf147-uEpvTa1bHDNlxUL2klHUMHJu Douglas Crockford channel

Questions?