



Software Solution Architect
main founder of 7Learn.com

وقتی میلی ثانیه ها مهم هستند!

بررسی کامل Request Flow با رویکرد بهبود سرعت لود صفحات وب





چرا متخصصین سئو باید
کمی فنی بلد باشند؟



ارتباطات



تقویت ابعاد مهارتی



Programming

Python

Computer Network

ML

**HTTP
Request Flow**

**Distributed
Systems**

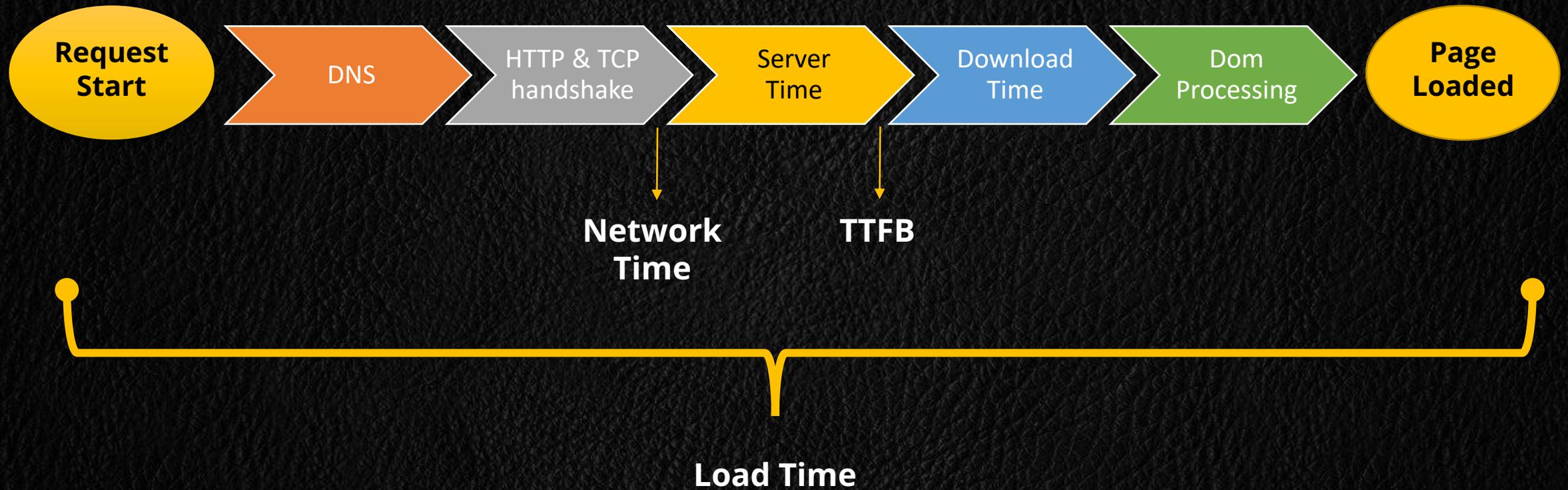




تفکر سیستمی، یک پیشنیاز مهم برای موفقیت در سئو



Request Flow



How request created?



Http Request Message

```
GET /doc/test.html HTTP/1.1  
Host: www.test101.com  
Accept: image/gif, image/jpeg, */*  
Accept-Language: en-us  
Accept-Encoding: gzip, deflate  
User-Agent: Mozilla/4.0  
Content-Length: 35  
  
bookId=12345&author=Tan+Ah+Teck
```

Request Line

Request Headers

A blank line separates header & body

Request Message Body

Request Message Header

Http Response Message

```
HTTP/1.1 200 OK  
Date: Sun, 08 Feb xxxx 01:11:12 GMT  
Server: Apache/1.3.29 (Win32)  
Last-Modified: Sat, 07 Feb xxxx  
ETag: "0-23-4024c3a5"  
Accept-Ranges: bytes  
Content-Length: 35  
Connection: close  
Content-Type: text/html  
  
<h1>My Home page</h1>
```

Status Line

Response Headers

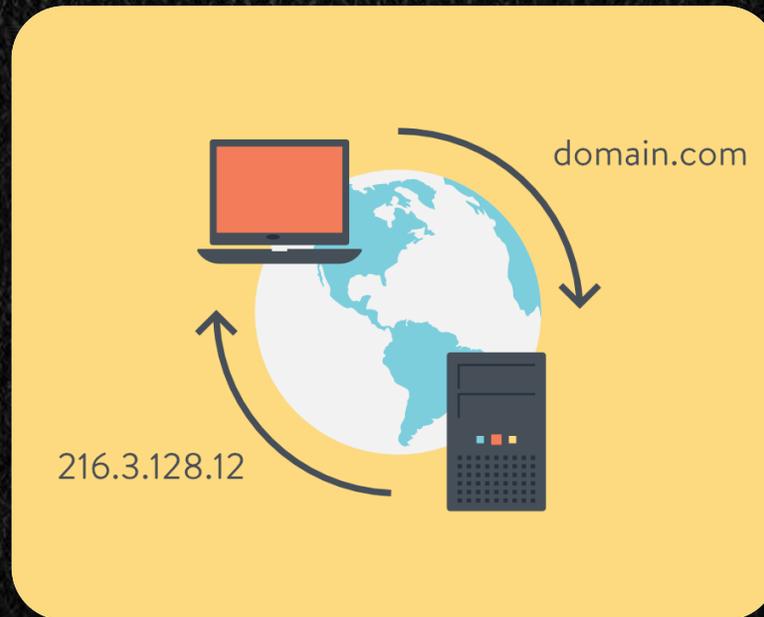
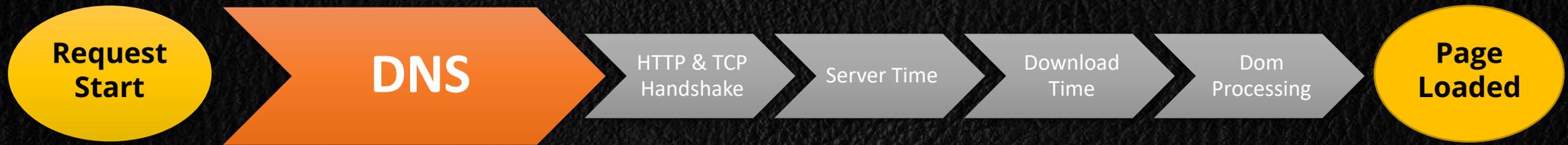
A blank line separates header & body

Response Message Body

Response Message Header

DNS Lookup

The phonebook of the Internet



DNS Providers list

2022-08-24

DNS providers sorted by DNSPerf rank ⁽ⁱ⁾ based on data for last 30 days

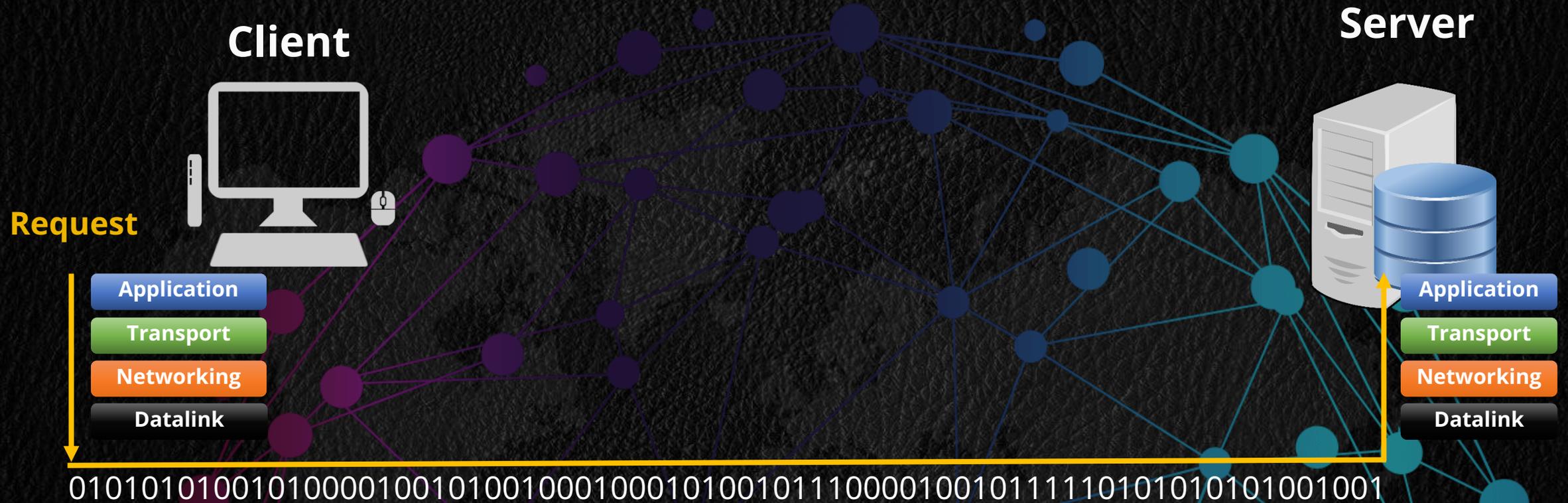
DNSPerf rank ↓	DNS Provider ↓	Uptime ↑	Quality ↑	Query time ↓
2	 Exoscale DNS	99.99%	99.97%	10.69 ms
3	 Cloudflare	99.98%	99.97%	10.96 ms
4	 Sectigo	99.99%	99.97%	10.69 ms
5	 DigitalOcean	99.98%	99.97%	12.73 ms
7	 WordPress.com	99.38%	99.34%	16.57 ms

وضعیت	موقعیت جغرافیایی	زمان پاسخ دهی	StatusPage	تاریخ
SOLVED	ایران - افرانت 	5504 ms	200	1401/06/04 08:48:18
SOLVED	ایران - آسیاتک 	755 ms	200	1401/06/04 08:48:16
SOLVED	ایران - ایرانسل 	1597 ms	200	1401/06/04 08:48:15
SOLVED	آلمان - دیجیتال اوشن 	782 ms	200	1401/06/04 08:48:14
SOLVED	ایران - مبین نت 	1097 ms	200	1401/06/04 08:48:14
SOLVED	ایران - آسیاتک 	1283 ms	200	1401/06/04 08:47:15
SOLVED	ایران - مبین نت 	1220 ms	200	1401/06/04 08:47:15
SOLVED	ایران - ایرانسل 	1064 ms	200	1401/06/04 08:47:15

HTTP & TCP Handshake



لایه های شبکه اینترنت

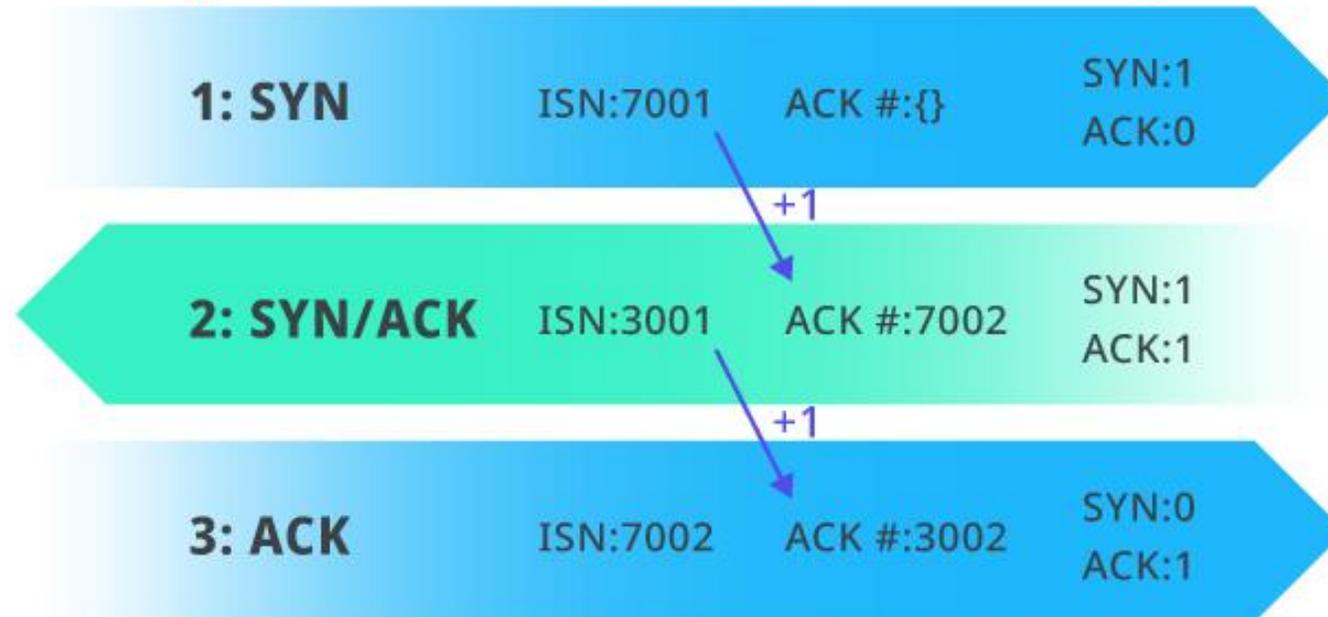


TCP 3-Way Handshake

End-user



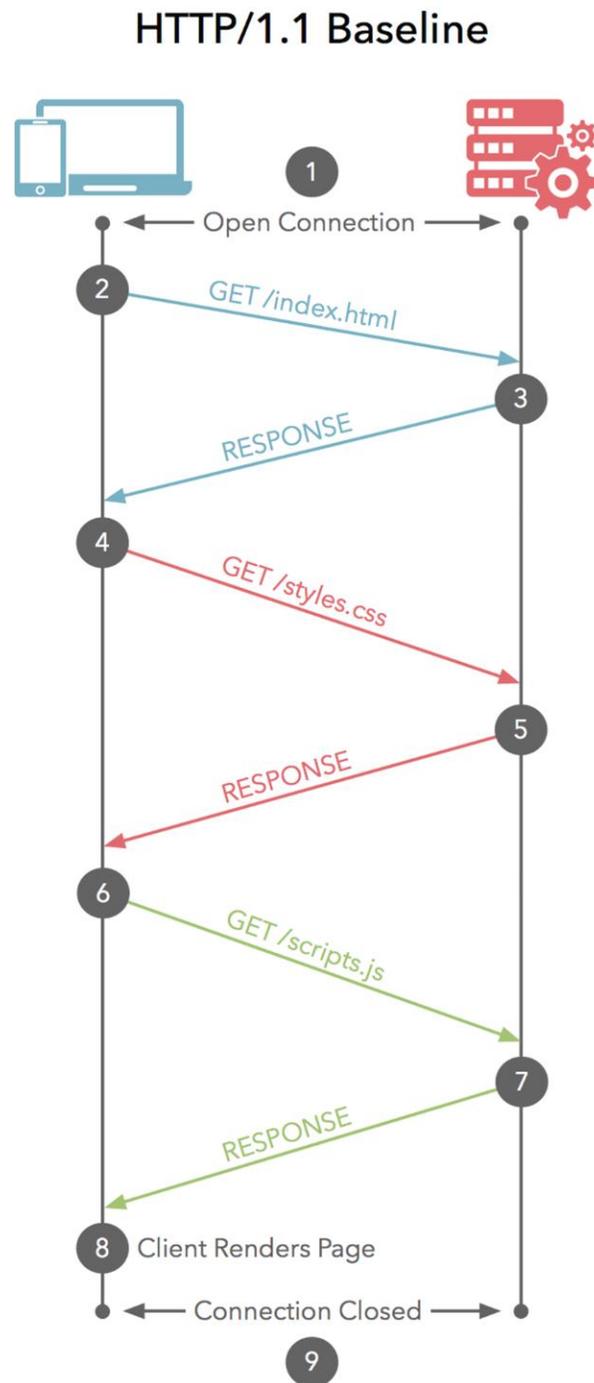
Host server



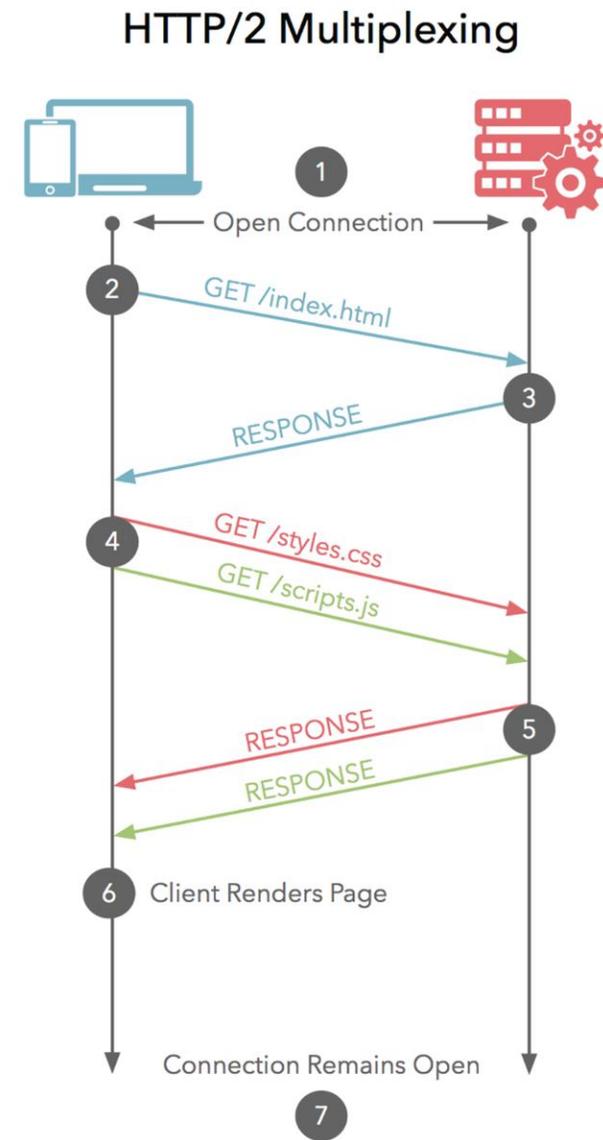
for establishing connection

HTTP1 vs HTTP2

- HTTP/2 Is Binary, Instead of Textual
- HTTP/2 Is Fully Multiplexed, Instead of Ordered & Blocking
- HTTP/2 Can Use One Connection for Parallelism
- HTTP/2 Uses Header Compression to Reduce Overhead
- HTTP/2 Allows Servers to "Push" Responses Proactively Into Client Caches



Time



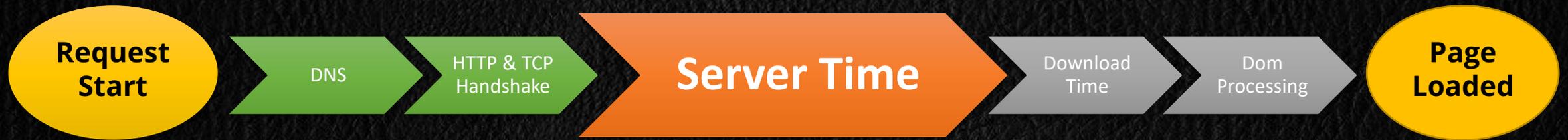
Improving Network time (1)

- DNS Lookup improvement
 - Always monitor requests
 - Using a Fast DNS Provider
 - Change TTL Values to Take Advantage of DNS Cache (hit rate)
- Take Advantage of DNS Prefetching
 - `<link rel="dns-prefetch" href="//www.google-analytics.com/ga.js">`
- Using Http/2

Improving Network time (2)

- Optimizing Request Count
 - Host third party resources locally
 - Remove unnecessary resources
 - Merge CSS & JS files into single file
- Using a CDN
- Defer Loading of JavaScript
 - `<script defer src="url.js"></script>`
- Lazy Loading for image & iframes
 - ``
 - `<iframe ... loading="lazy"></iframe>`

Server Time



Wordpress Sites!



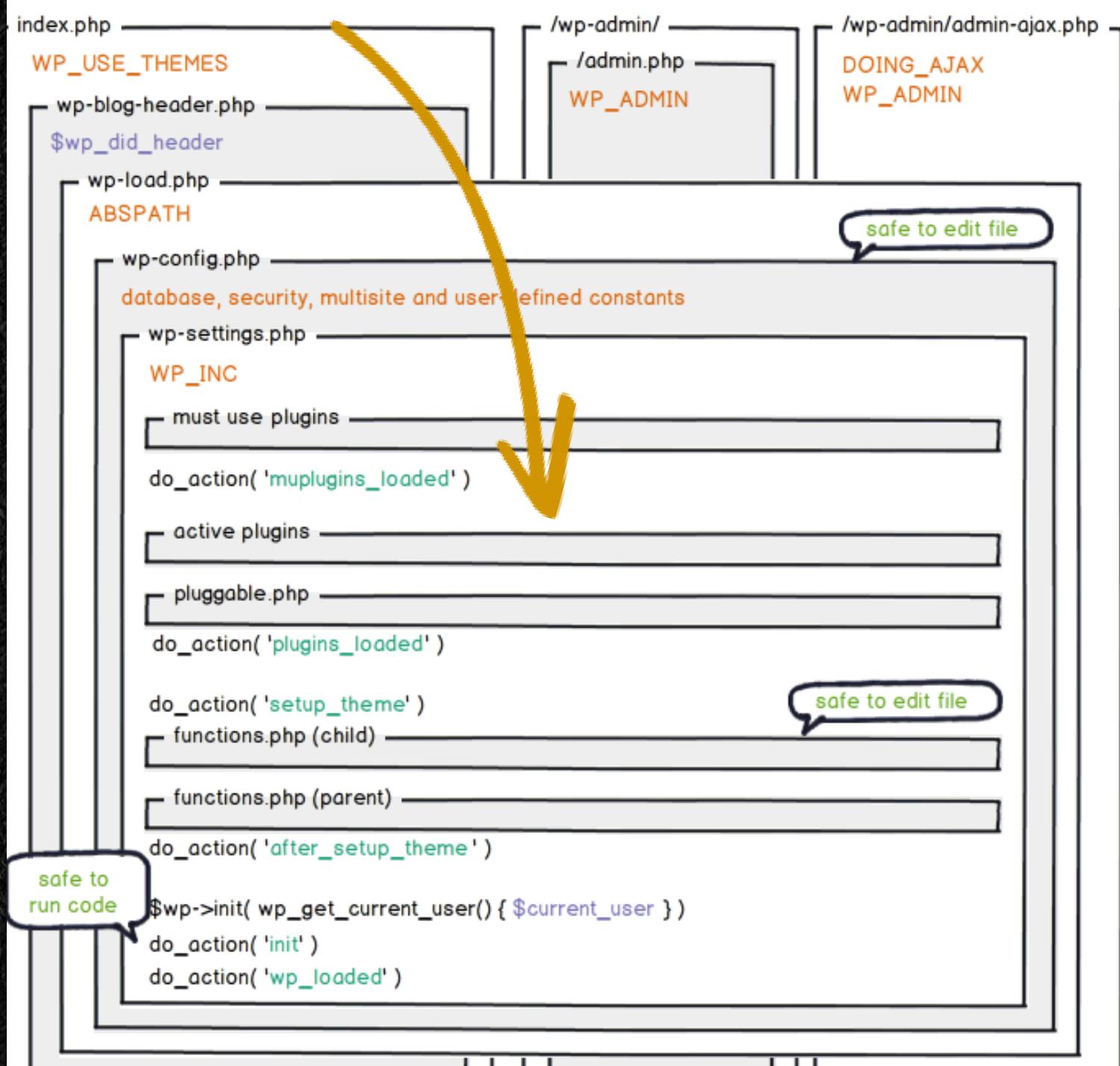
Before



After

WP Core Load!

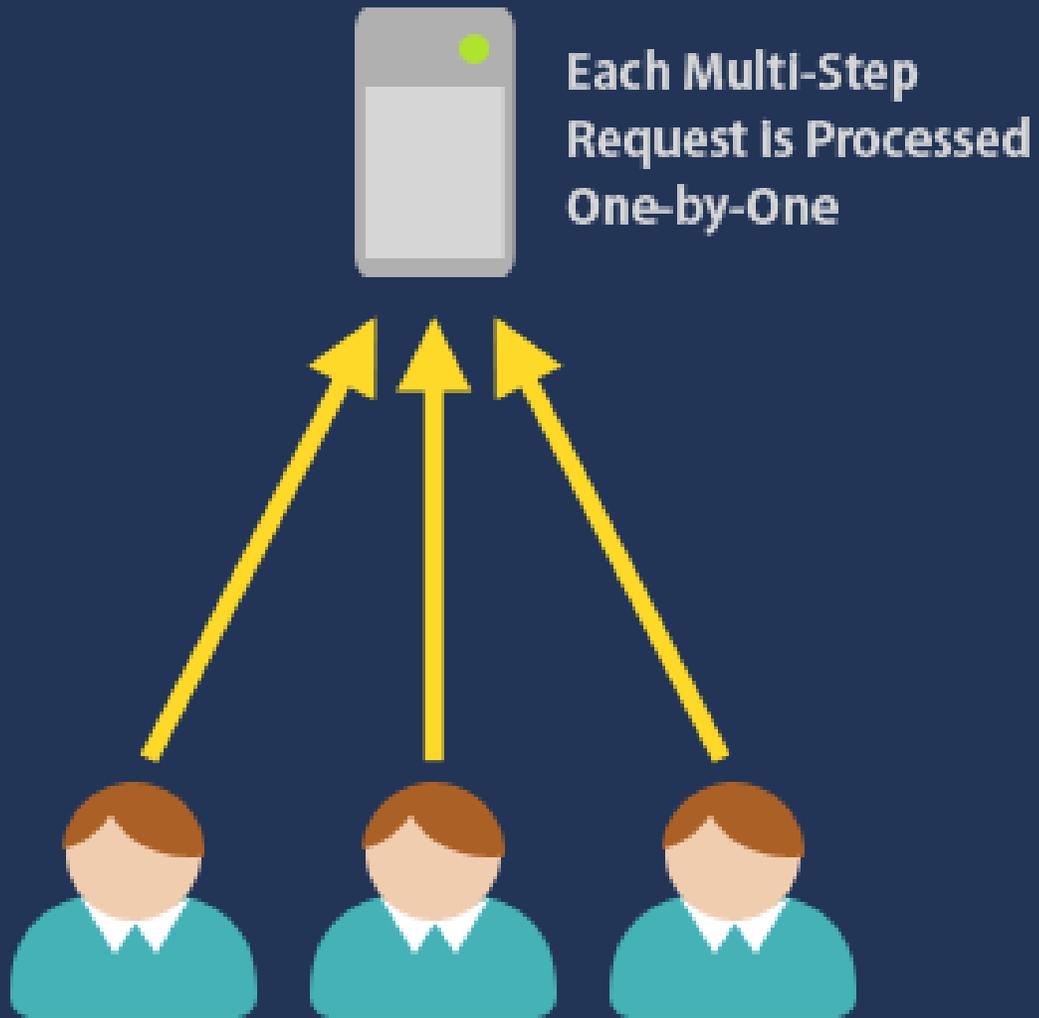
- Is WP really bad?
 - intended purpose?
 - Lack of knowledge?
 - Amount of customization?



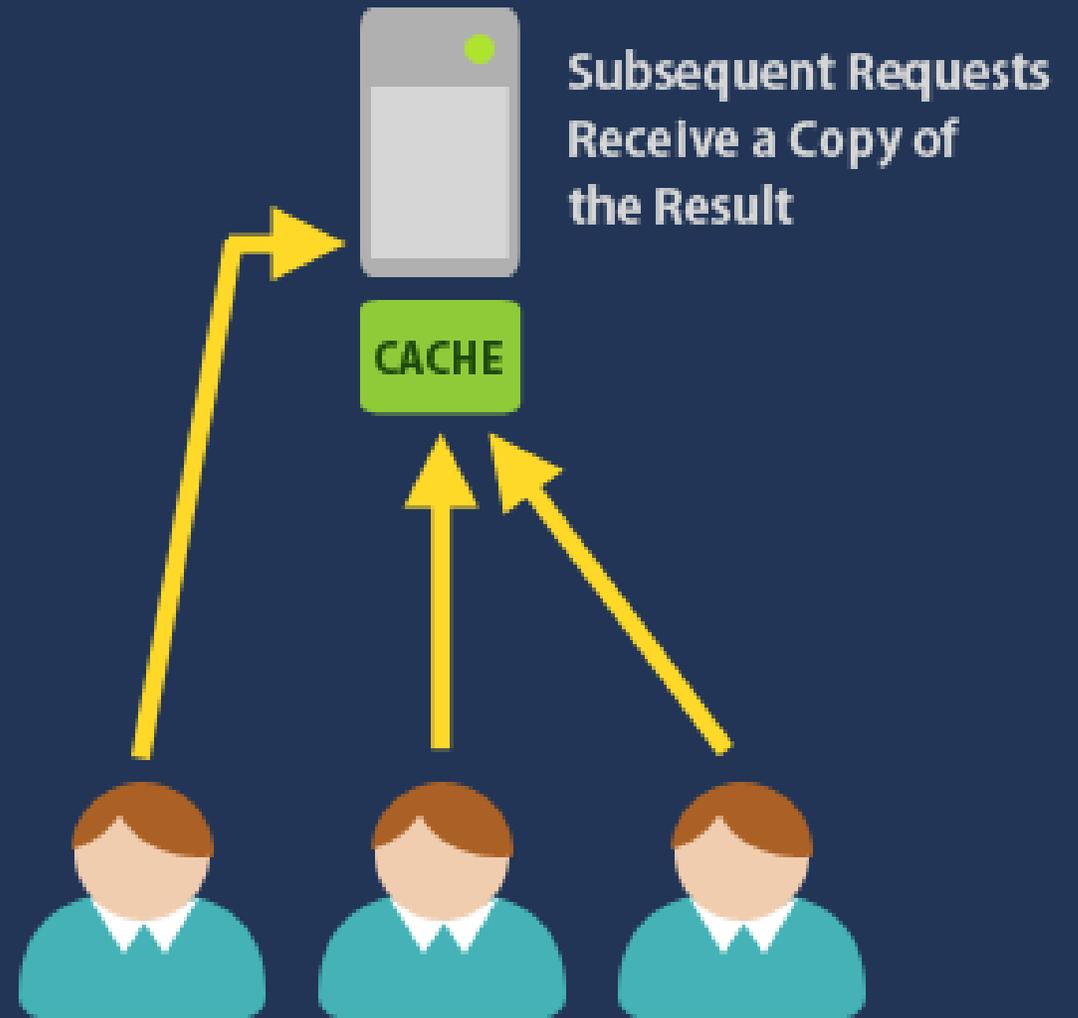
Server Time Optimization

- Choosing the right hosting service
 - Type: Shared, Cloud, VPS, Dedicated
 - Resources: CPU, Ram, Disk , Bandwidth
 - Stability , uptime, Security, Support
- Code Quality!
 - Stack, Architecture, Error Tracking, ...
- Database!
 - Storage device, Database Design, Query Optimization

NO CACHING



CACHING



Download Time



Download Time Improvement

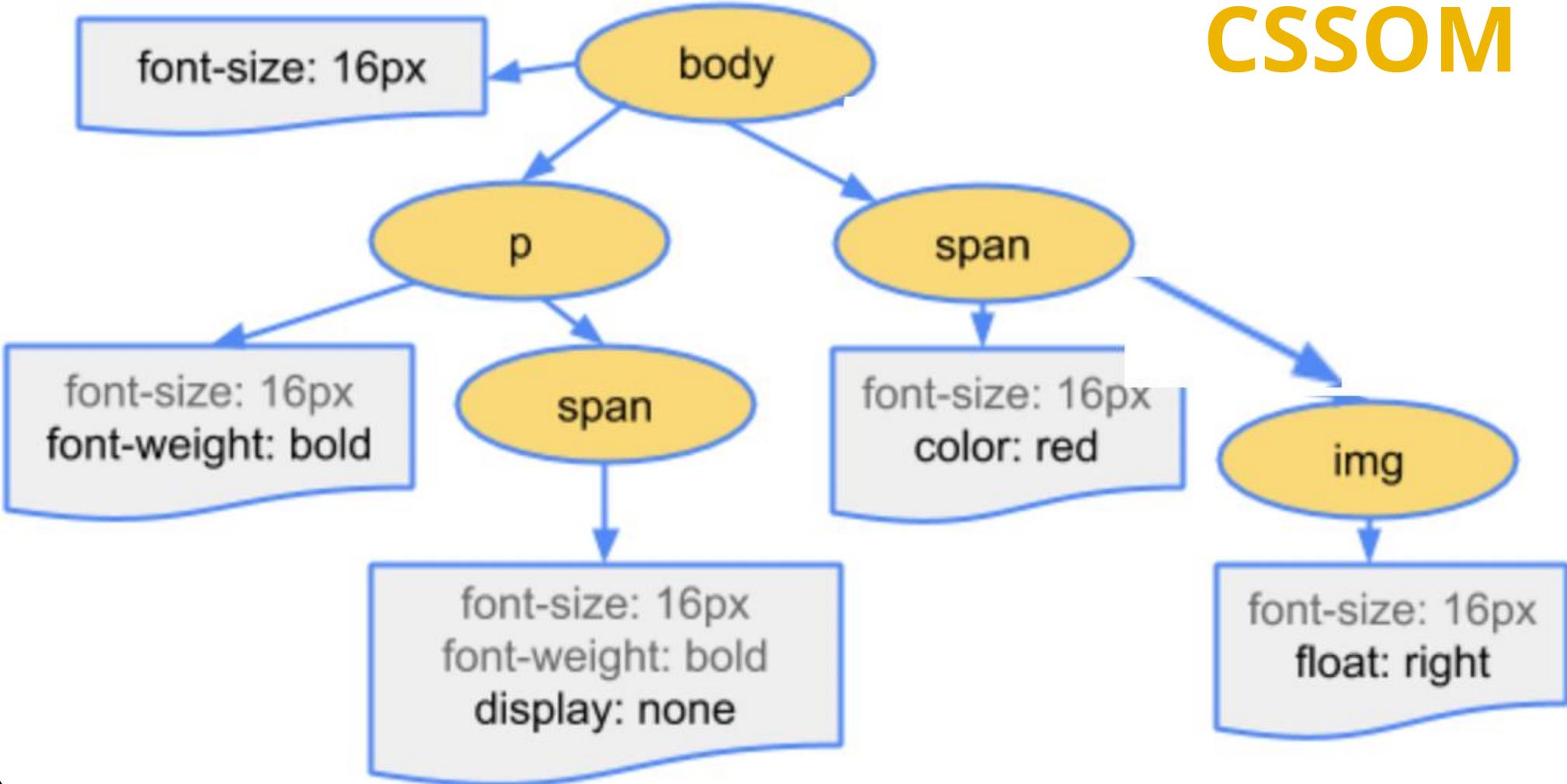
- Optimize Request Count
 - Host third party resources locally fo cache
 - Remove unnecessary resources
 - Merge css & js files into single file
- Compress request and response messages
- Compress html , css , js , img files
- Optimize Browser Caching

DOM Processing



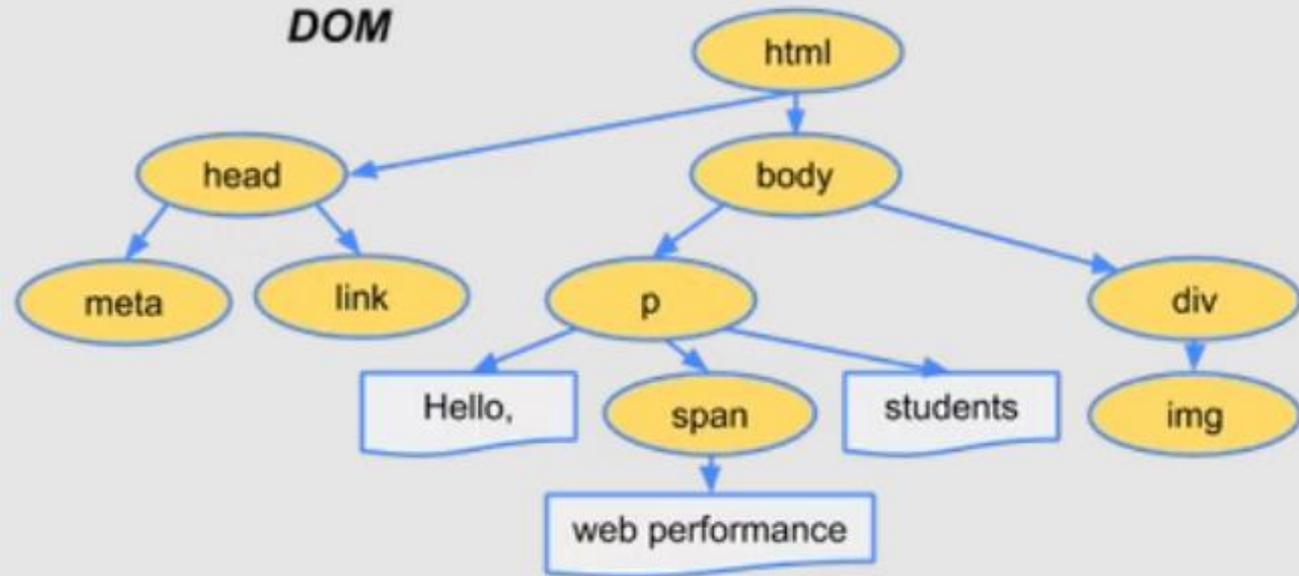
Avoid an excessive DOM size

CSSOM

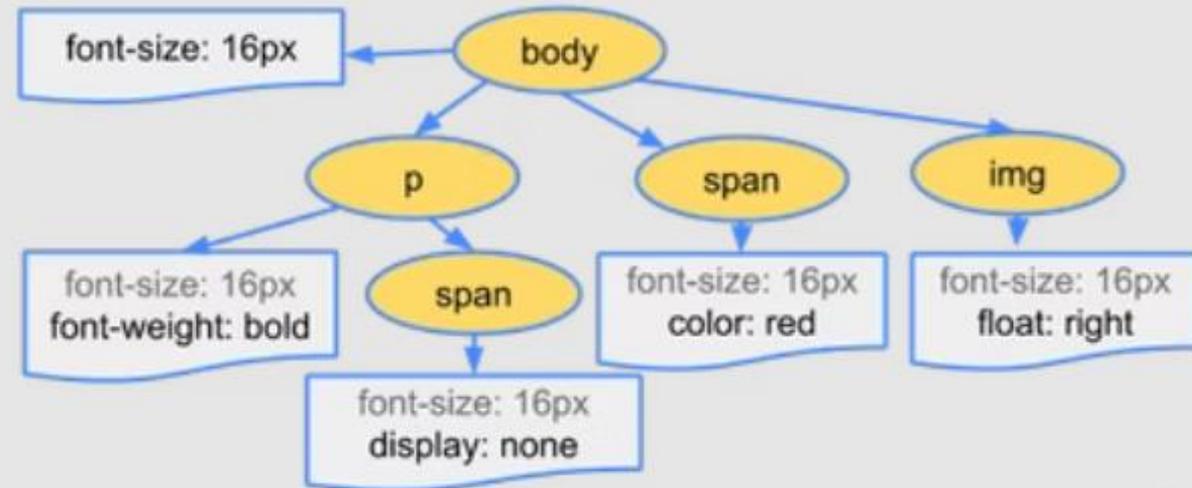


Render Tree!

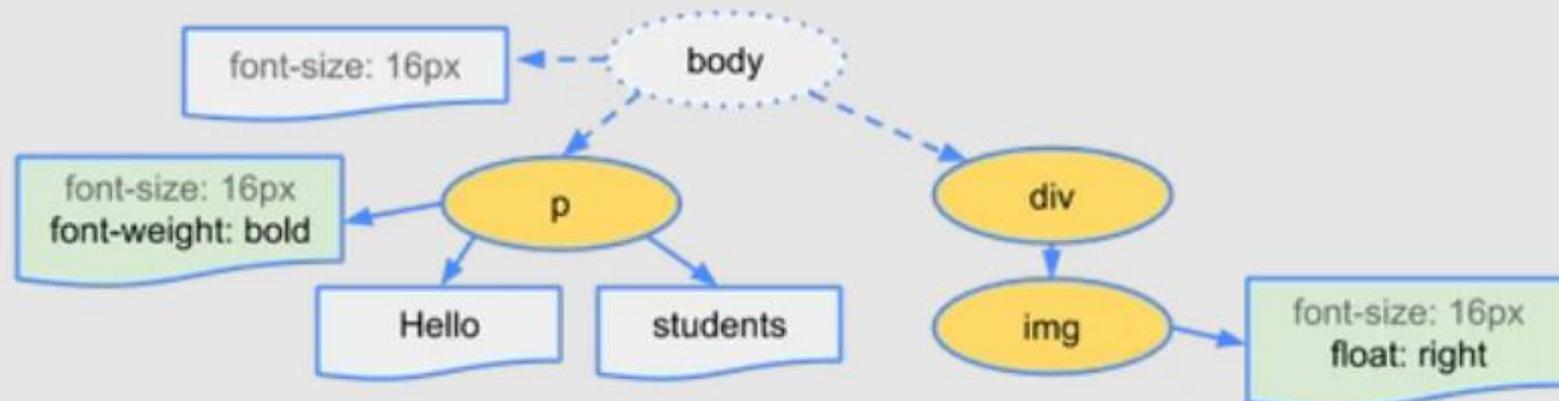
DOM



CSSOM



Render Tree



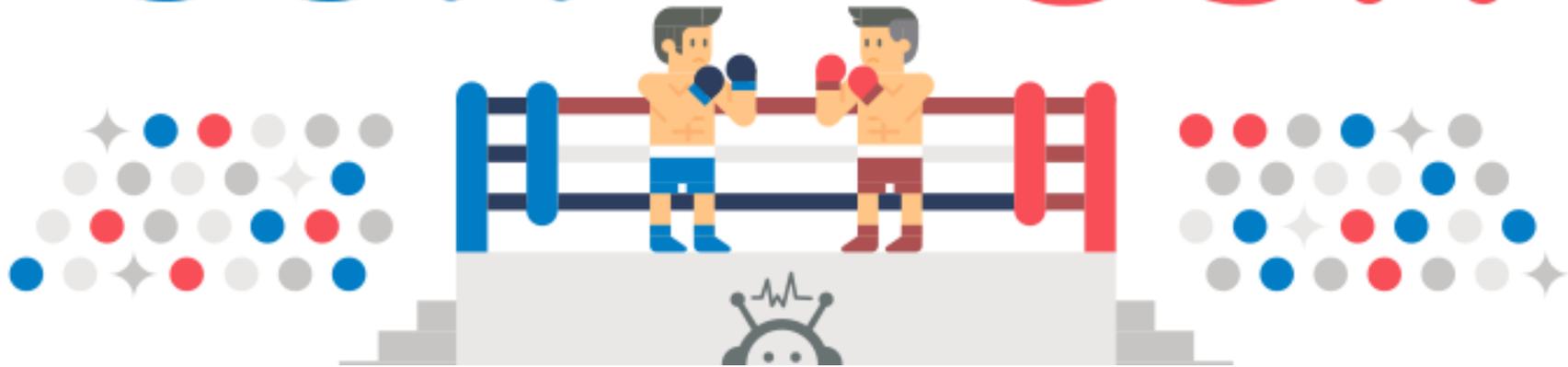
The Cost of excessive DOM size!

- Network efficiency and load performance
 - Increases the number of bytes transferred
- Runtime performance
 - Slows down page rendering
- Memory performance
 - Overwhelms the memory resources of your user's machine

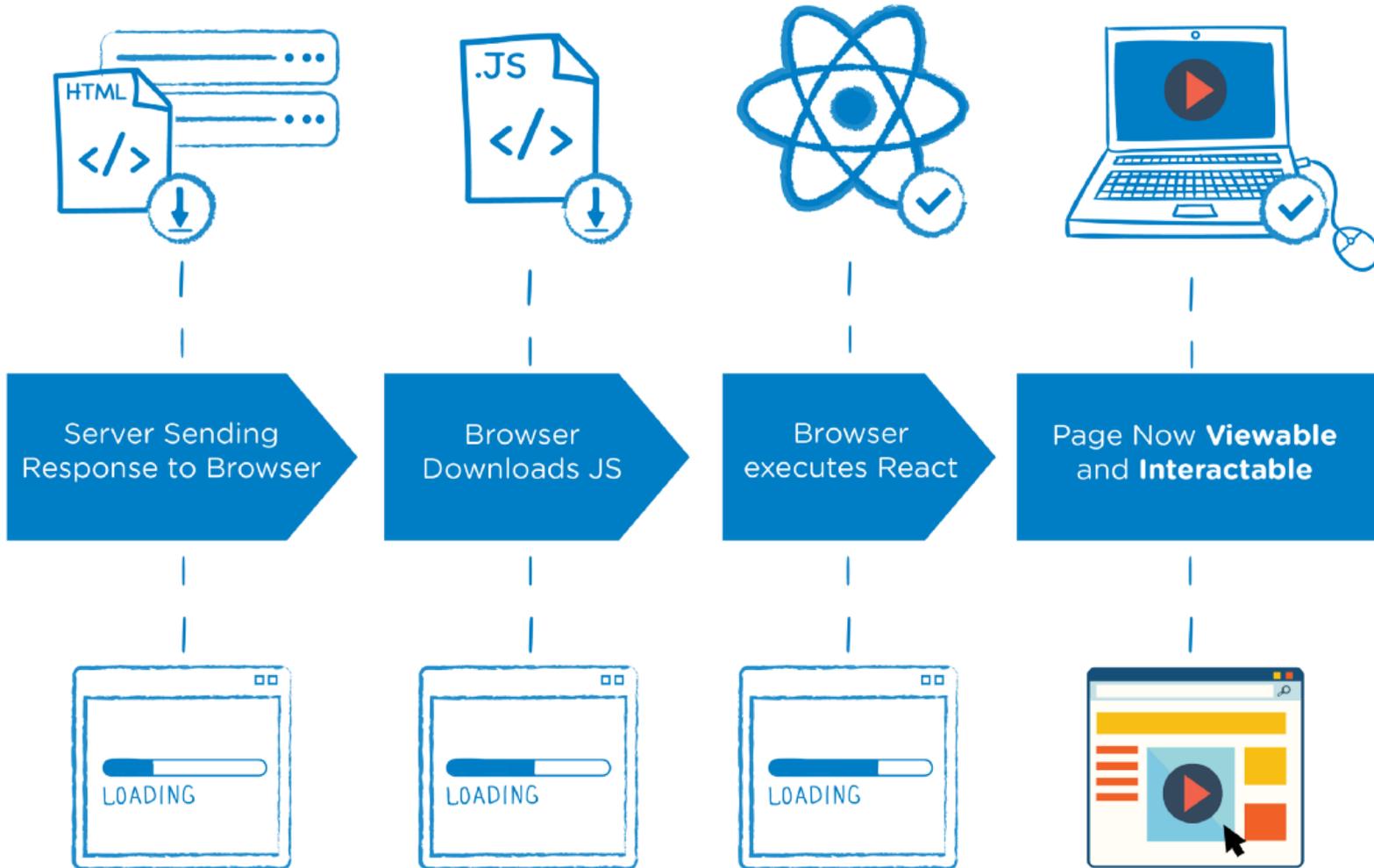
Render tree Optimization

- **Keep your HTML/CSS structure basic**
 - Don't use poorly coded plugins or themes
 - Minimize DOM nodes created by JavaScript
 - Don't use page builders that generate bloated HTML
 - Don't copy-paste text into the WYSIWYG editor
 - Don't hide unwanted elements using CSS
- Tip1: Implement lazy load and infinite scroll
- Tip2: Create multiple pages instead of one long page
- Tip3: Improve page rendering with the content-visibility property
- Tip4: Avoid using complicated CSS and JavaScript (**div:last-child**)

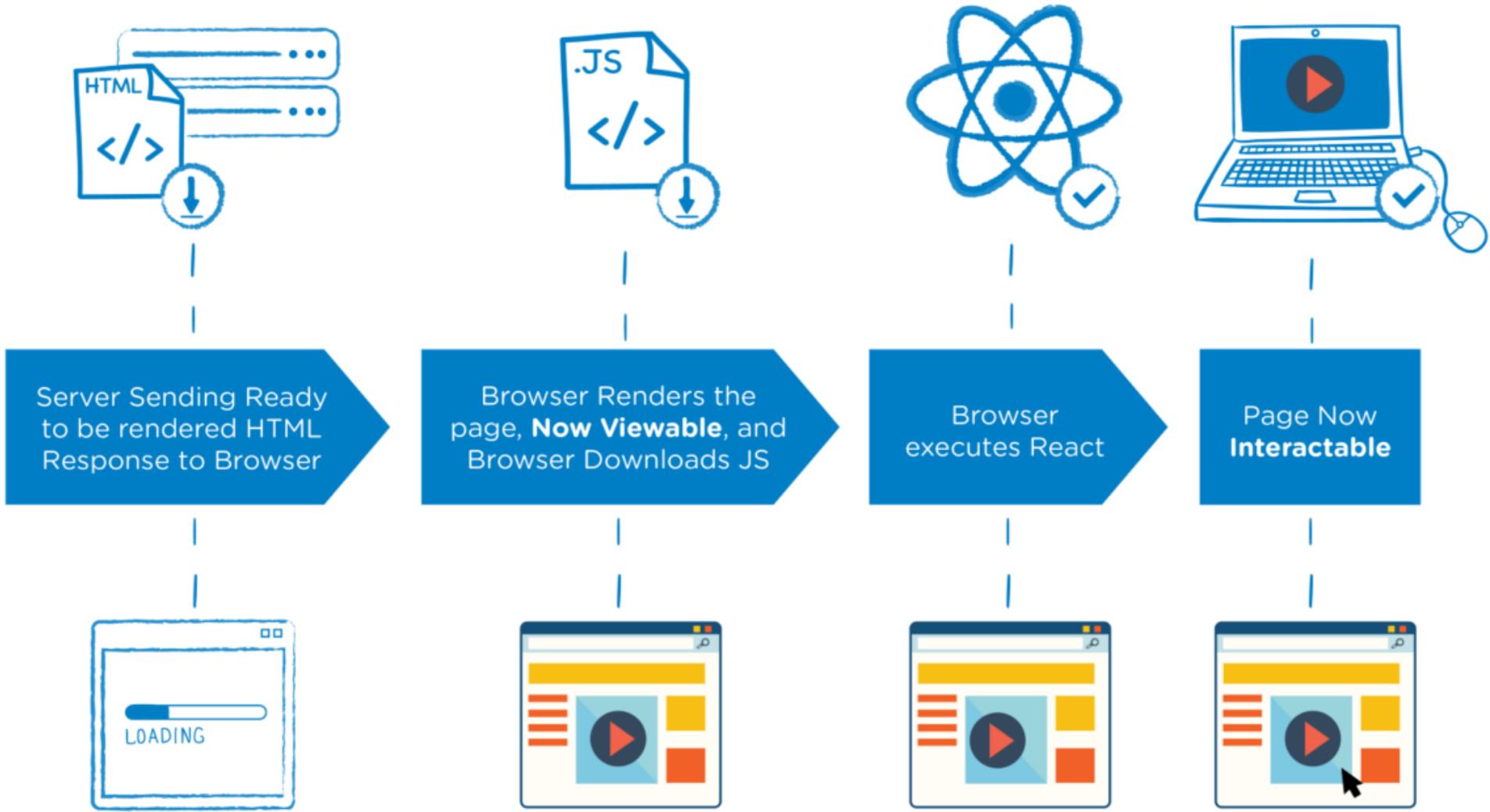
SSR VS CSR



CSR



SSR





Request Start

DNS

TCP, SSL ,
...

Server Time

Download Time

Dom Processing

Page Loaded




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