



# Идёт загрузка...

или

Как доставлять нужное вовремя

# Никита Дубко



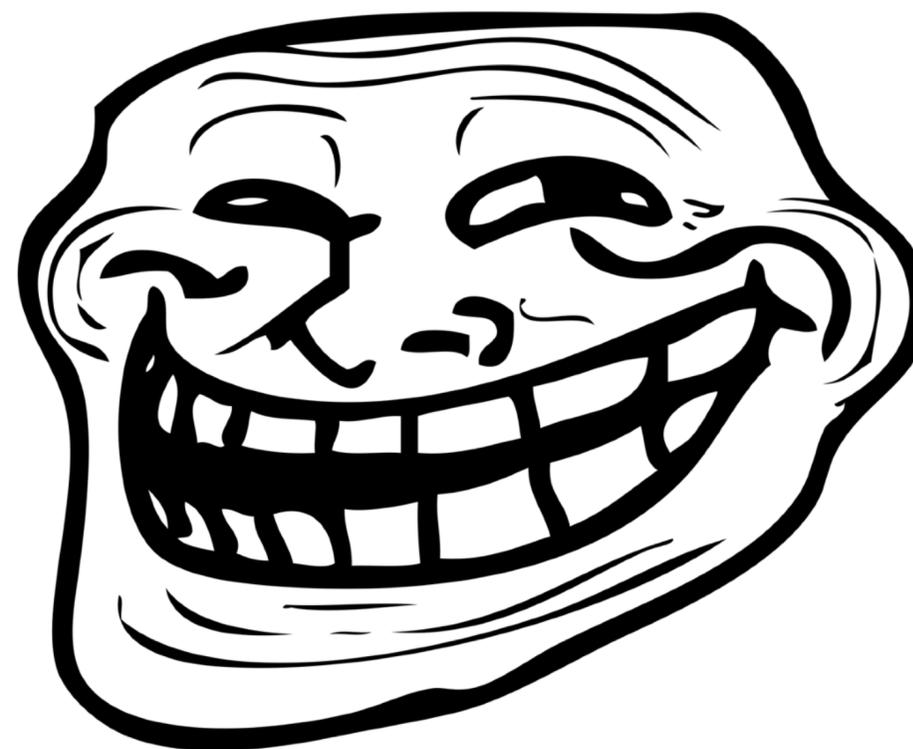
- Старший руководитель продуктов Контеста
- Пятый голос подкаста «Веб-стандарты»
- Люблю быструю загрузку сайтов
- В веб-разработке больше 16 лет



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2008 год



**Веб-мастер**

**до 128 Кбит/с**

I N T E R N E T

A R C H I V E





MEDIAN DESKTOP  
**2758.0 KB**  
▲489.7%

MEDIAN MOBILE  
**2477.3 KB**  
▲1610.8%

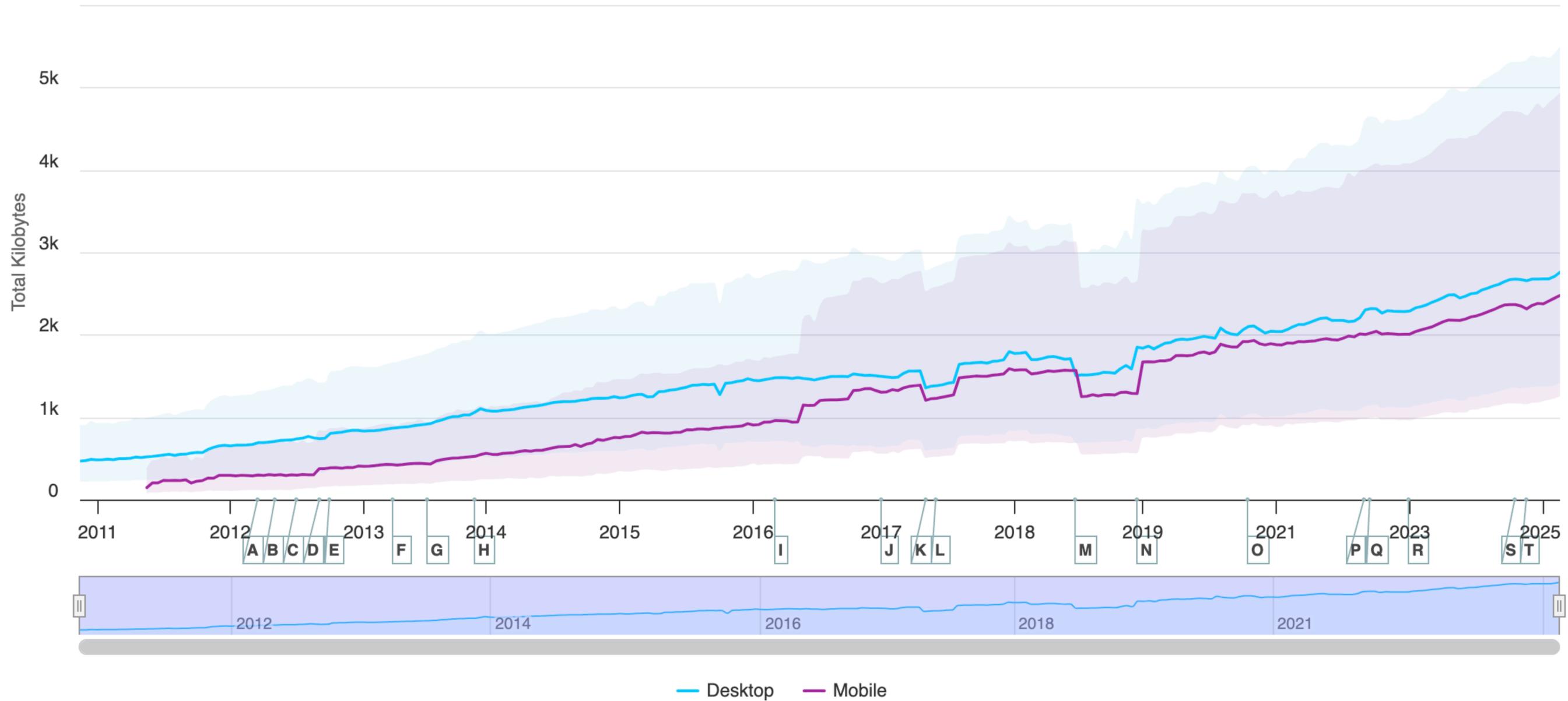
### Timeseries of Total Kilobytes

Source: [httparchive.org](http://httparchive.org)



Zoom 1m 3m 6m YTD 1y 3y **All**

15 Nov 2010 → 1 Apr 2025

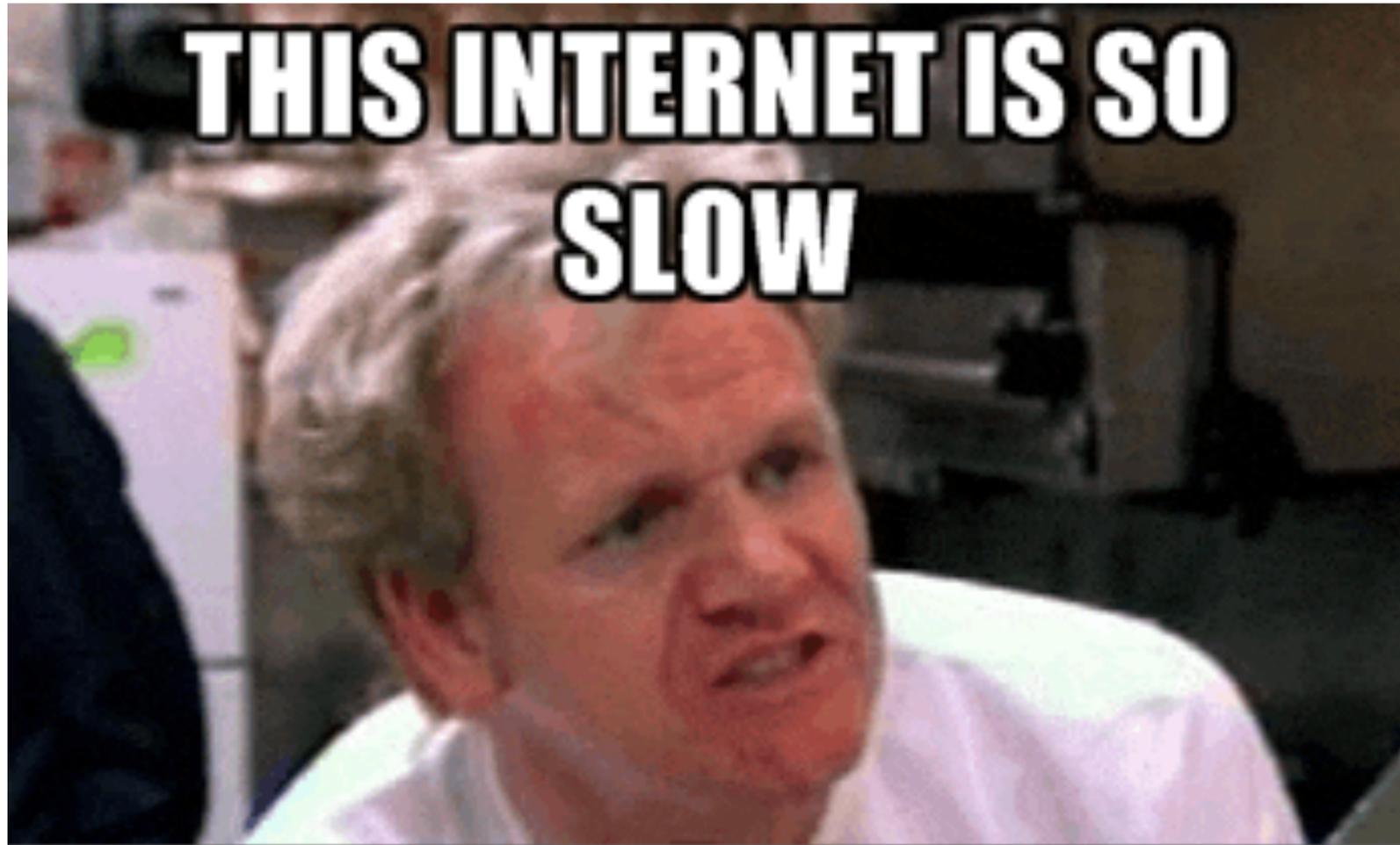


**Размер страницы: 468 КБ**

**Скорость: 128 Кбит/с**

**Время: 14.625 с**

**THIS INTERNET IS SO  
SLOW**





**А ничё тот факт, что уже  
2025 год?**

MEDIAN DESKTOP  
**2758.0 KB**  
▲489.7%

MEDIAN MOBILE  
**2477.3 KB**  
▲1610.8%

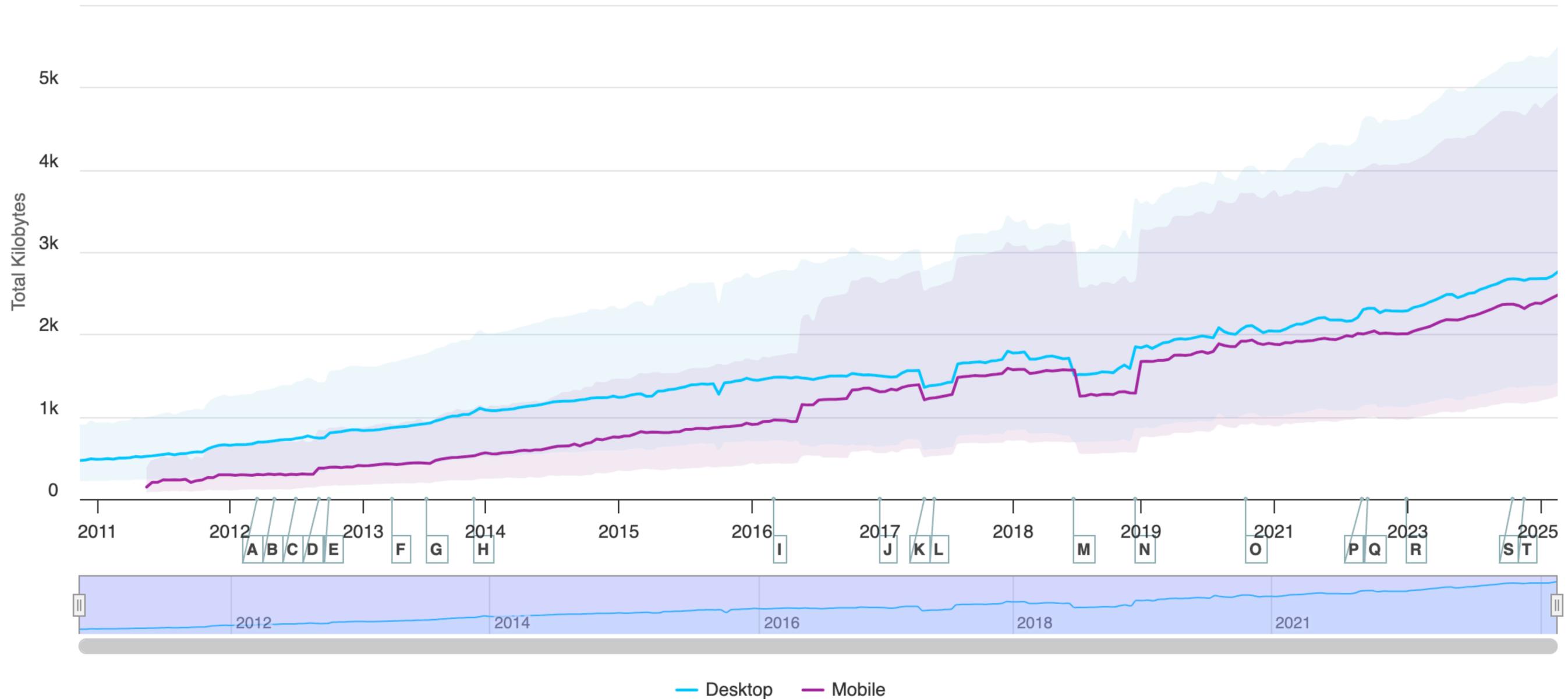
### Timeseries of Total Kilobytes

Source: [httparchive.org](http://httparchive.org)



Zoom 1m 3m 6m YTD 1y 3y **All**

15 Nov 2010 → 1 Apr 2025



— Desktop — Mobile

**Размер страницы: 2758 КБ**

**Скорость: 100 Мбит/с**

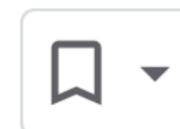
**Время: 0.22 с**

**14.625 c → 0.22 c**

**14.625 c → 0.22 c**



# Using site speed in web search ranking



[Send feedback](#)

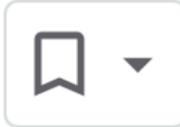
*Friday, April 09, 2010*

 It's been a while since we published this blog post. Some of the information may be outdated (for example, some images may be missing, and some links may not work anymore). Check out our [latest blog posts](#) on this topic instead.

You may have heard that here at Google we're obsessed with speed, in [our products](#) and [on the web](#). As part of that effort, today we're including a new signal in our search ranking algorithms: site speed. Site speed reflects how quickly a website responds to web requests.

# Using page speed in mobile search ranking

[Send feedback](#)



*Wednesday, January 17, 2018*

★ **Update July 9, 2018:** The Speed Update is now rolling out for all users.

People want to be able to find answers to their questions as fast as possible – [studies](#) show that people really care about the speed of a page. Although speed has been used in ranking for some time, that [signal](#) was focused on desktop searches. Today we're announcing that starting in July 2018, page speed will be a ranking factor for mobile searches.

*(Loading)*

# LCP

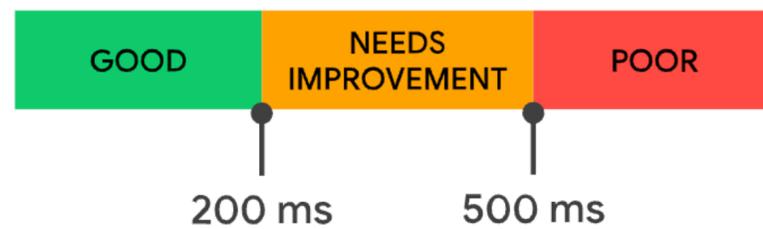
Largest Contentful Paint



*(Interactivity)*

# INP

Interaction to Next Paint



*(Visual Stability)*

# CLS

Cumulative Layout Shift



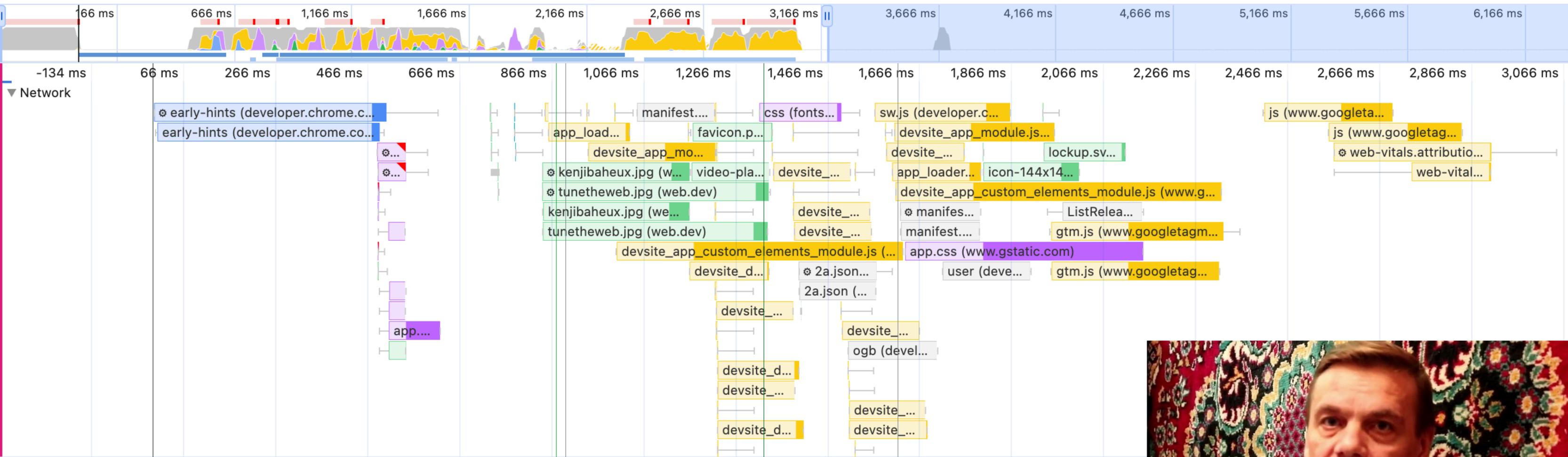
**Сайты должны  
загружаться быстро**

A cartoon illustration of a green frog with a purple collar and a red tag. The frog is positioned in the center of the frame. The background consists of a dense field of colorful, radiating lines in shades of red, green, blue, and purple, creating a vibrant, starburst effect. The text is overlaid on the frog's body.

**Сайты должны  
загружаться быстро**



**Как браузеры  
загружают сайты?**





# TBILISI JS

TYPESCRIPT /JAVASCRIPT COMMUNITY

**MEETUP #3**

31 OCTOBER 2024

**DEBUGGING PAGE  
PERFORMANCE WITH  
BROWSER TOOLS**

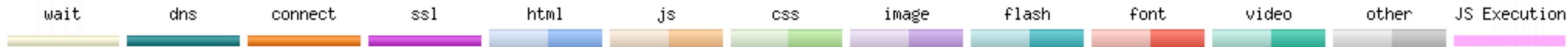
MIKITA DUBKO



	<b>Duration</b>	<b>619.07 ms</b>
└─	Queuing and connecting	0.56 ms
▒	Request sent and waiting	473.78 ms
▒	Content downloading	31.43 ms
└─	Waiting on main thread	113.30 ms



**WebPageTest**  
by catchpoint®



- 1. dump-ekb.ru - /
- 2. fonts.googleapis.com - o
- 3. static.tildac...ge471676
- 4. static.tildac...cards-1.
- 5. static.tildac...-grid-3.
- 6. static.tildac...forms-1.
- 7. static.tildac...ation-2.
- 8. static.tildac...ery-1.10
- 9. thb.tildacdn.com - logo-dum
- 10. neo.tildacdn.com...llback-1
- 11. static.tildacdn.com - dump-
- 12. thb.tildacdn.com - zI1Trimg
- 13. thb.tildacdn.com - image.pr
- 14. thb.tildacdn.com - tg.png
- 15. static.tildacdn...scripts-3
- 16. static.tildacdn...page47167
- 17. static.tildacdn...azyload-1
- 18. static.tildacdn...imation-2
- 19. static.tildacdn...da-zero-1
- 20. static.tildacdn...a-cards-1
- 21. static.tildacdn.com - hamme
- 22. static.tildacdn...da-feed-1
- 23. static.tildacdn...da-slids-1
- 24. static.tildacdn...a-forms-1
- 25. static.tildacdn...da-menu-1

Request #1
Details
Request Response Raw Details Object Request Blocking
X

**Host:** dump-ekb.ru  
**IP:** 185.129.100.112  
**Error/Status Code:** 200  
**Priority:** Highest  
**Protocol:** HTTP/2  
**HTTP/2 Stream:** 1, weight 256, depends on 0, EXCLUSIVE  
**Request ID:** CB0D1BBE5B50BBDA0A1288E927F63F53

**Timing**

**Discovered:** 0.007 s  
**Request Start:** 0.954 s  
**DNS Lookup:** 429 ms  
**Initial Connection:** 256 ms  
**SSL Negotiation:** 266 ms  
**Total Connection Time:** 951 ms  
**Time to First Byte:** 291 ms  
**Content Download:** 344 ms  
**CPU Time:** 573 ms

# Этапы запроса

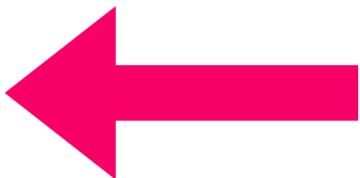
1. DNS Lookup и поиск IP-адреса
2. Соединение с сервером
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5. Получение ответа сервера
6. Обработка ответа сервера



# Дисклеймер

Народная мудрость: «Доверяй, но проверяй». Каждый из предложенных советов имеет как достоинства, так и недостатки. Если у меня сработало, это не значит, что так же сработает у вас. Автор доклада не несёт ответственности за раскатынные в продакшен перфоманс-баги, которые слушатели внесли в проект после прослушивания доклада. Если вы всё ещё читаете этот длинный текст, то вот вам интересный факт. Ленивец перемещается со скоростью около двух метров в минуту.

# Этапы запроса

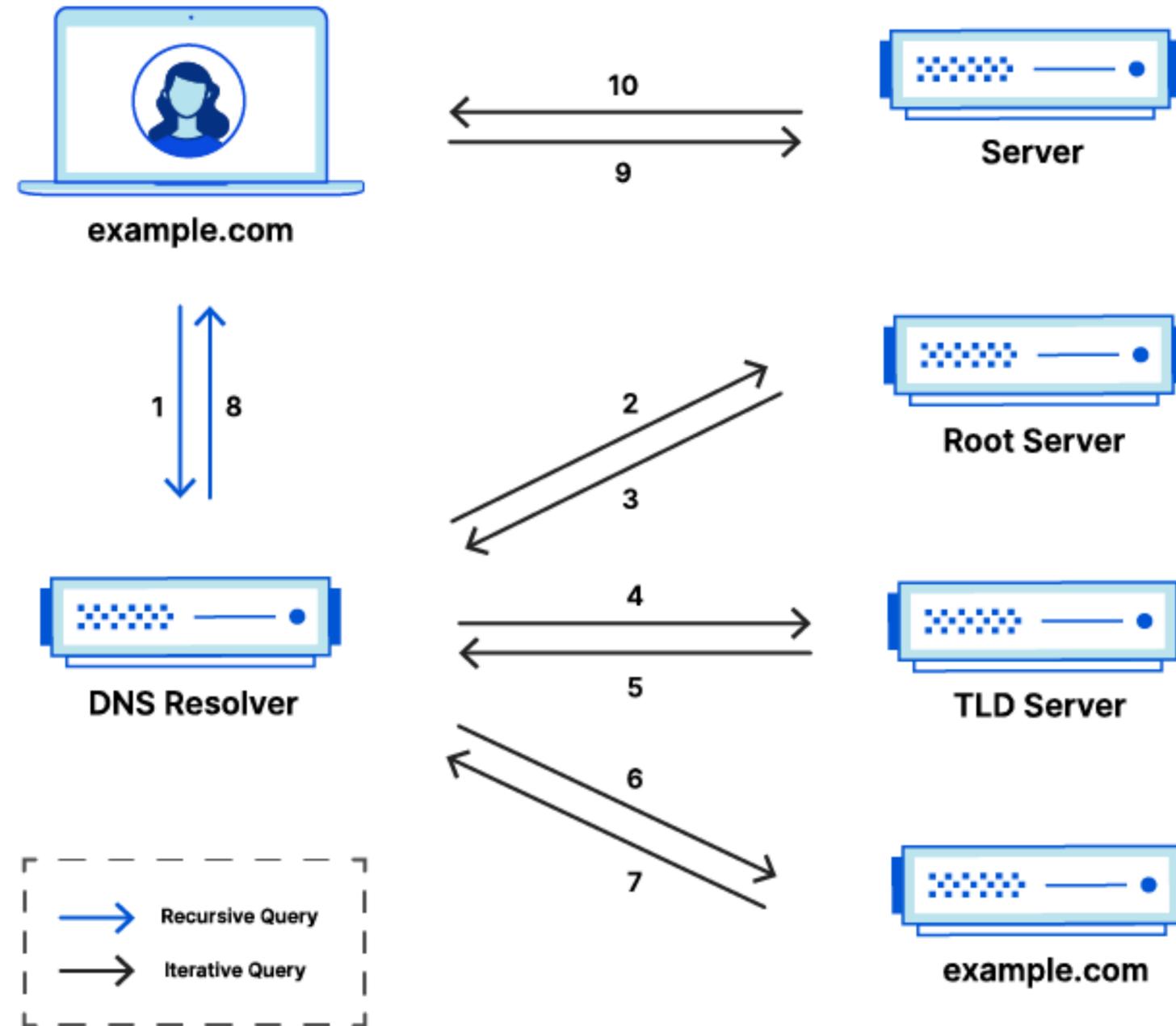
- 1. DNS Lookup и поиск IP-адреса** 
2. Соединение с сервером
3. Установка безопасного соединения (TLS/SSL)
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6. Обработка ответа сервера

**mefody.dev**



**34.234.106.80**

# Complete DNS Lookup and Webpage Query



# Preload Scanner



```
<html lang="en" dir="ltr">
<head>
  <link rel="stylesheet"
        href="//fonts.googleapis.com/css?family=Material+Icons">
  <link rel="stylesheet"
        href="/style.css">
  <script src="https://some.cdn.com/app_module.js"></script>
</head>
...
```

```
<html lang="en" dir="ltr">
<head>
  <link rel="stylesheet"
    href="//fonts.googleapis.com/css2?family=Material+Icons">
  <link rel="stylesheet"
    href="/style.css">
  <script src="https://some.cdn.com/app_module.js"></script>
</head>
...
```

Качать!

```
<html lang="en" dir="ltr">
<head>
  <link rel="stylesheet"
    href="//fonts.googleapis.com/css?family=Material+Icons">
  <link rel="stylesheet"
    href="/style.css"> Качать!
  <script src="https://some.cdn.com/app_module.js"></script>
</head>
...
```

```
@font-face {  
    font-family: 'Material Icons';  
    font-style: normal;  
    font-weight: 400;  
    font-display: swap;  
    src: url(https://fonts.gstatic.com/s/  
materialicons/v1/1q2 ... K8gw.woff2) format('woff2');  
}
```

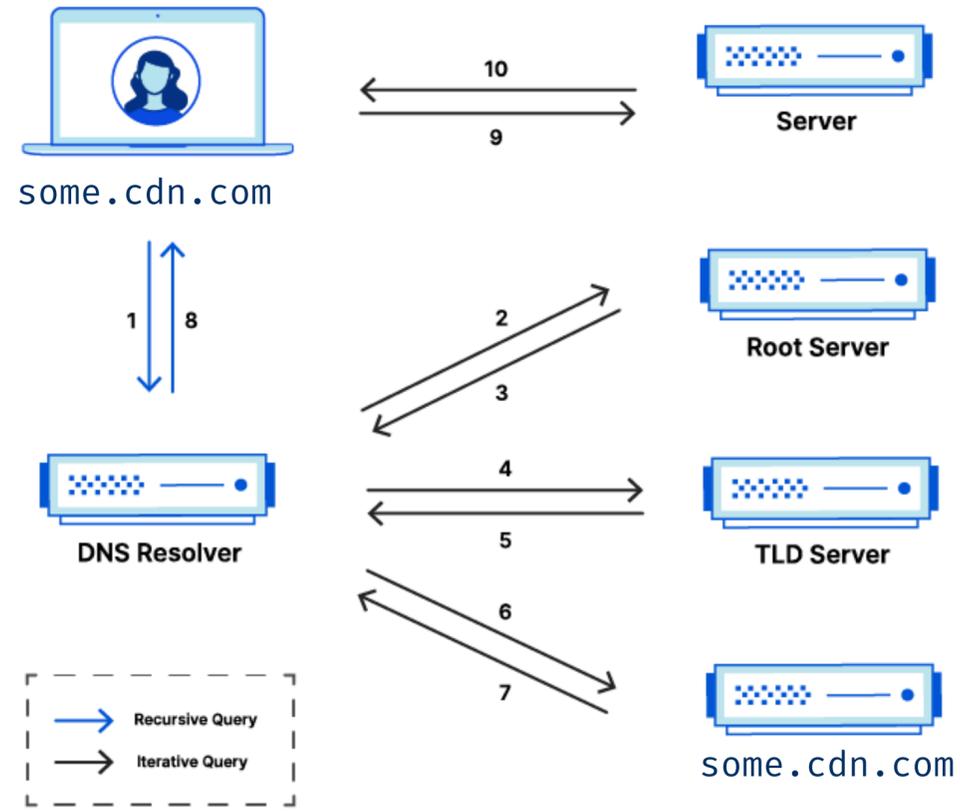
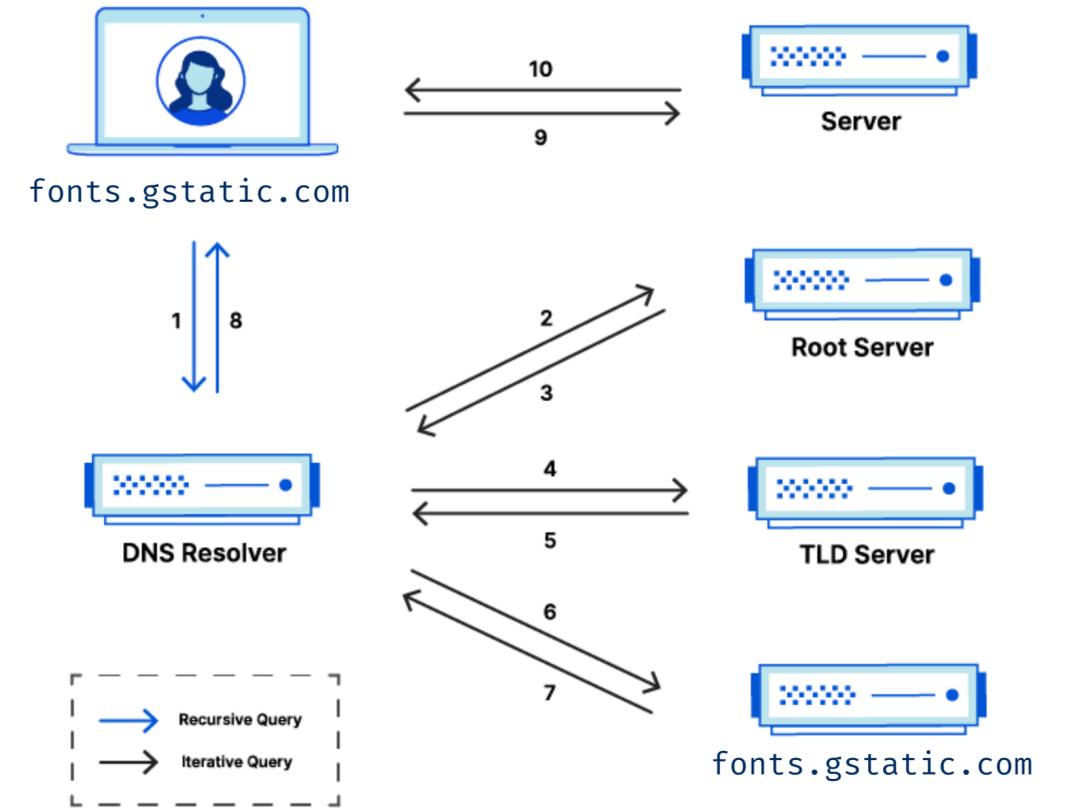
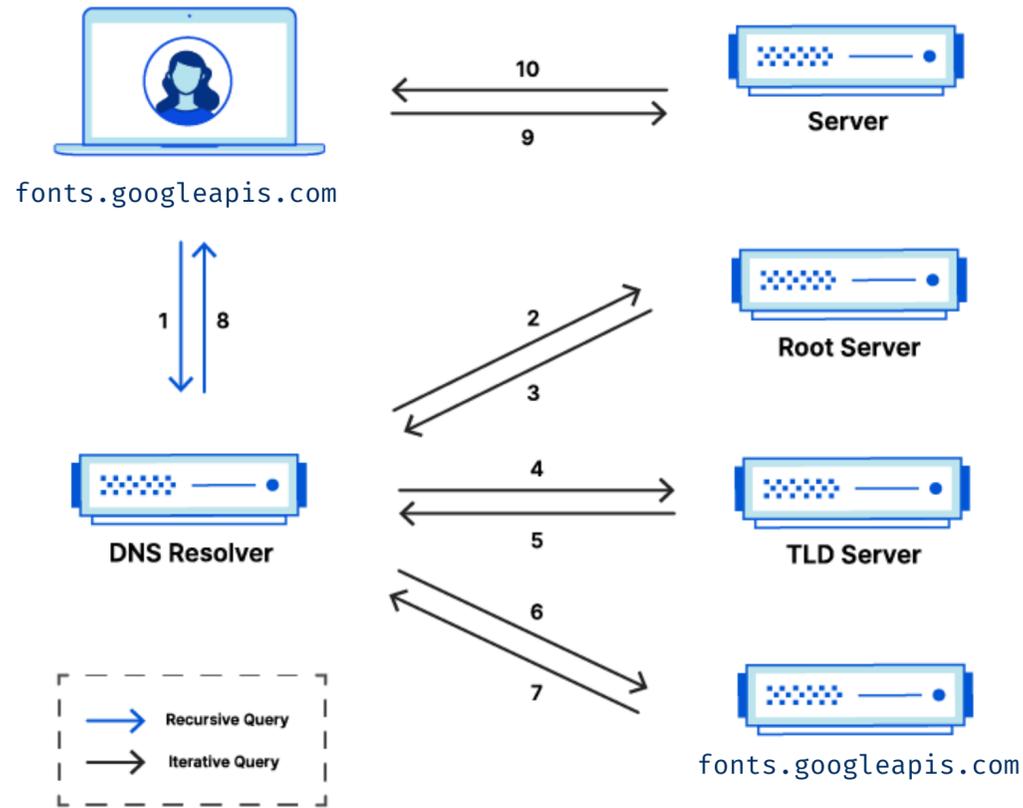
```
<html lang="en" dir="ltr">
<head>
  <link rel="stylesheet"
    href="//fonts.googleapis.com/css?family=Material+Icons">
  <link rel="stylesheet"
    href="/style.css">
  <script src="https://some.cdn.com/app_module.js"></script>
</head>
...
```

Качать!

fonts.googleapis.com

fonts.gstatic.com

some.cdn.com



```
<html lang="en" dir="ltr">
<head>
  <link rel="preconnect" href="//fonts.googleapis.com">
  <link rel="preconnect" href="//fonts.gstatic.com" crossorigin>
  <link rel="preconnect" href="//some.cdn.com">
  <link rel="stylesheet"
        href="//fonts.googleapis.com/css2?family=Material+Icons">
  <link rel="stylesheet"
        href="/style.css">
  <script src="https://some.cdn.com/app_module.js"></script>
</head>
...
```



9 December, 2023

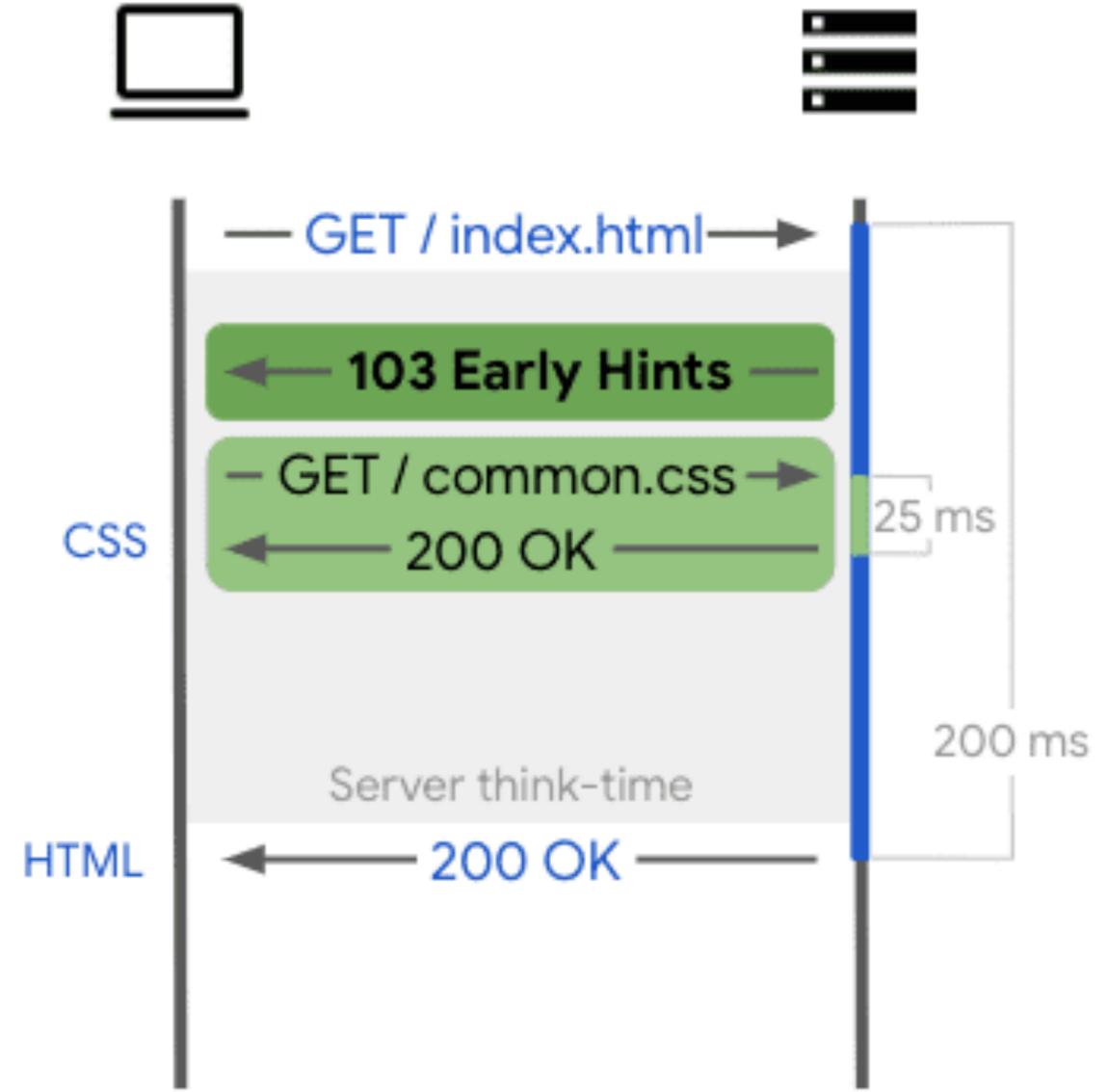
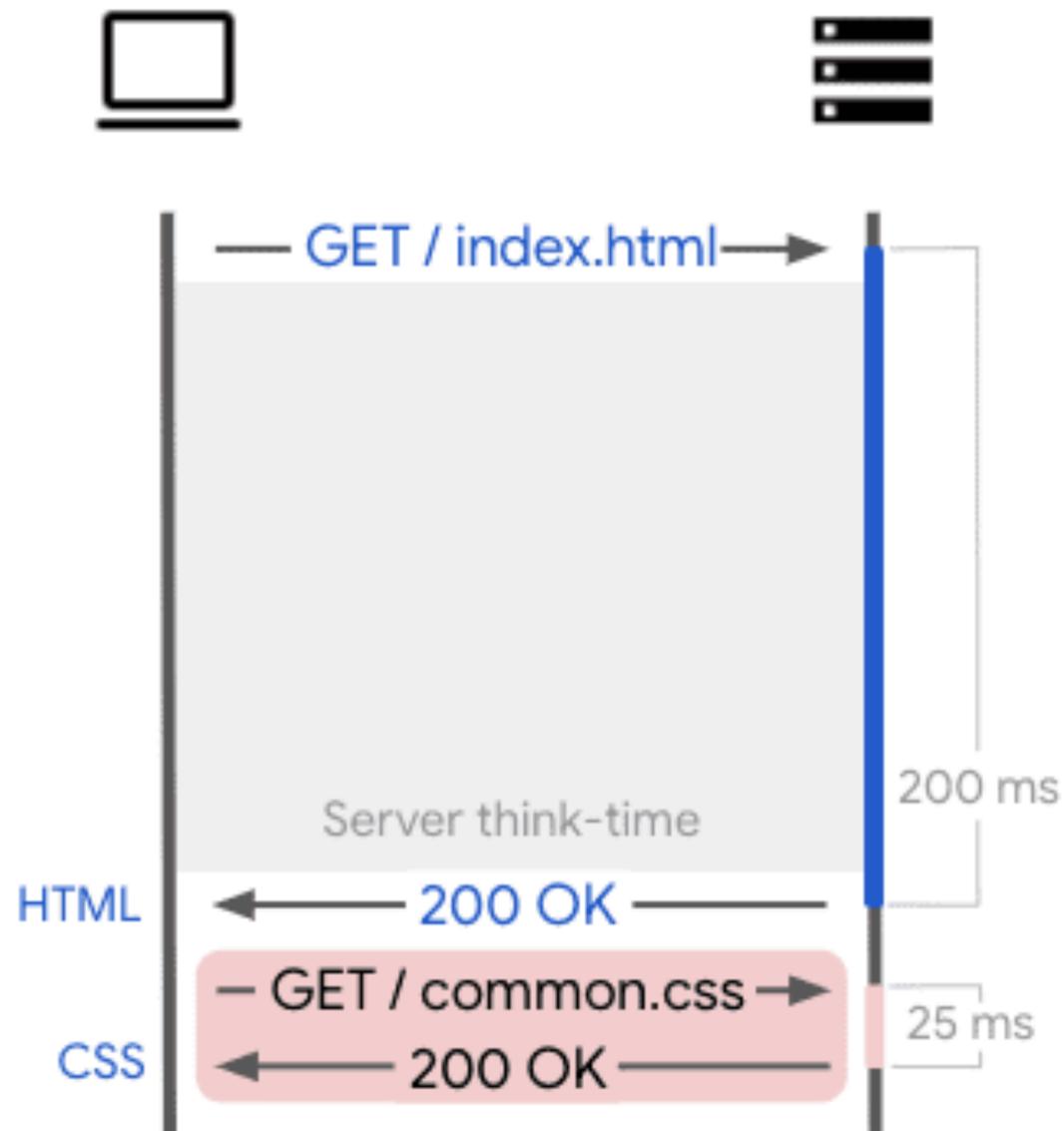
# Correctly Configure (Pre) Connections

## Table of Contents

A trivial performance optimisation to help speed up third-party or other-origin requests is to **preconnect** them: hint that the browser should preemptively open a full connection (**DNS**, **TCP**, **TLS**) to the origin in question, for example:

```
<link rel=preconnect href=https://fonts.googleapis.com>
```

# 103 Early Hints



```
// Node.js v18.11.0+

const earlyHintsLinks = [
  '<https://fonts.googleapis.com>; rel=preconnect'
];

res.writeEarlyHints({
  'link': earlyHintsLinks,
});
```

GET /catalog

Host: myshop.com

...

103 Early Hints

Link: <<https://fonts.googleapis.com>>; rel=preconnect

...

200 OK

...

# HTTP Early Hints PoC #326

New issue

Open arut wants to merge 1 commit into nginx:master from arut:early-hints

Conversation 4 Commits 1 Checks 1 Files changed 11

+664 -4



arut commented on Nov 17, 2024 · edited

Contributor

The change implements parsing Early Hints response from the proxied server and forwarding it to the client. Also, an Early Hints response could be sent to the client by the upstream module before choosing a proxied server. This happens if there are headers to send, which can be configured or added by third-party modules using the early hint filters.

A new parameter "early" is added to the "add\_header" directive. The parameter instructs nginx to send this header as part of Early Hints response. The header is also sent in the main response. Also, a new directive "early\_hints" is added, which accepts a predicate to enable Early Hints.

Example:

```
add_header X-Foo foo early;
early_hints $http2 $http3;
proxy_pass http://bar.example.com;
```



upd: added early\_hints directive and renamed the parameter to early.

[How to avoid issues for clients that don't support Early Hints](#) (thanks @bavshin-f5).

### Reviewers

patryk4815  
At least 1 approving review is required to merge this pull request.

### Assignees

No one assigned

### Labels

feature

### Projects

None yet

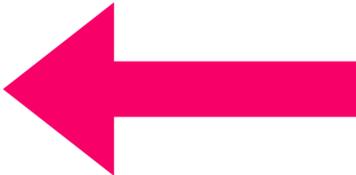
### Milestone

No milestone



**Всё на одном домене**

# Этапы запроса

1. DNS Lookup и поиск IP-адреса
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6. Обработка ответа сервера

**T**ransmission

**C**ontrol

**P**rotocol



Client



Server

Closed

SYN-SENT

ESTABLISHED

LISTEN

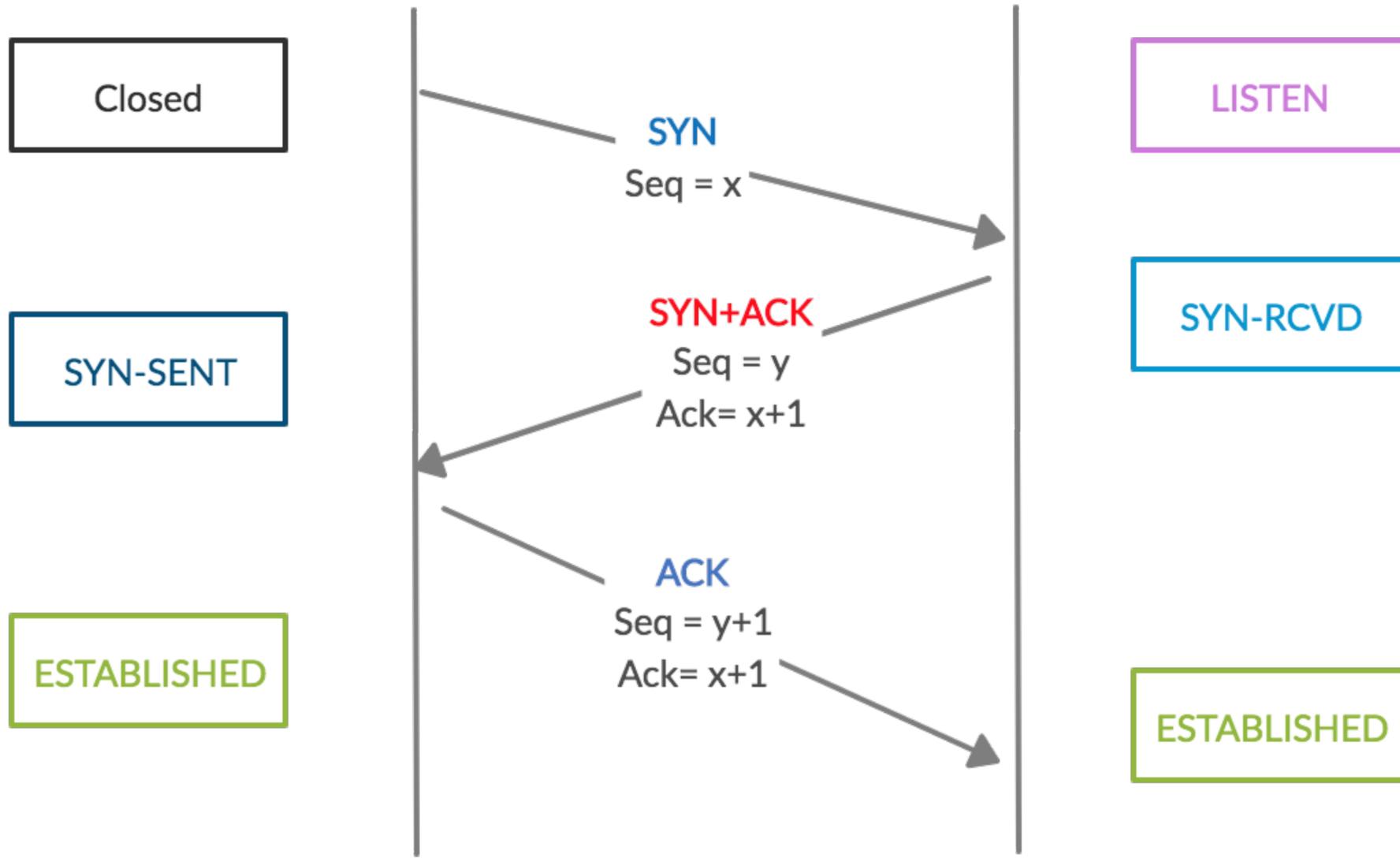
SYN-RCVD

ESTABLISHED

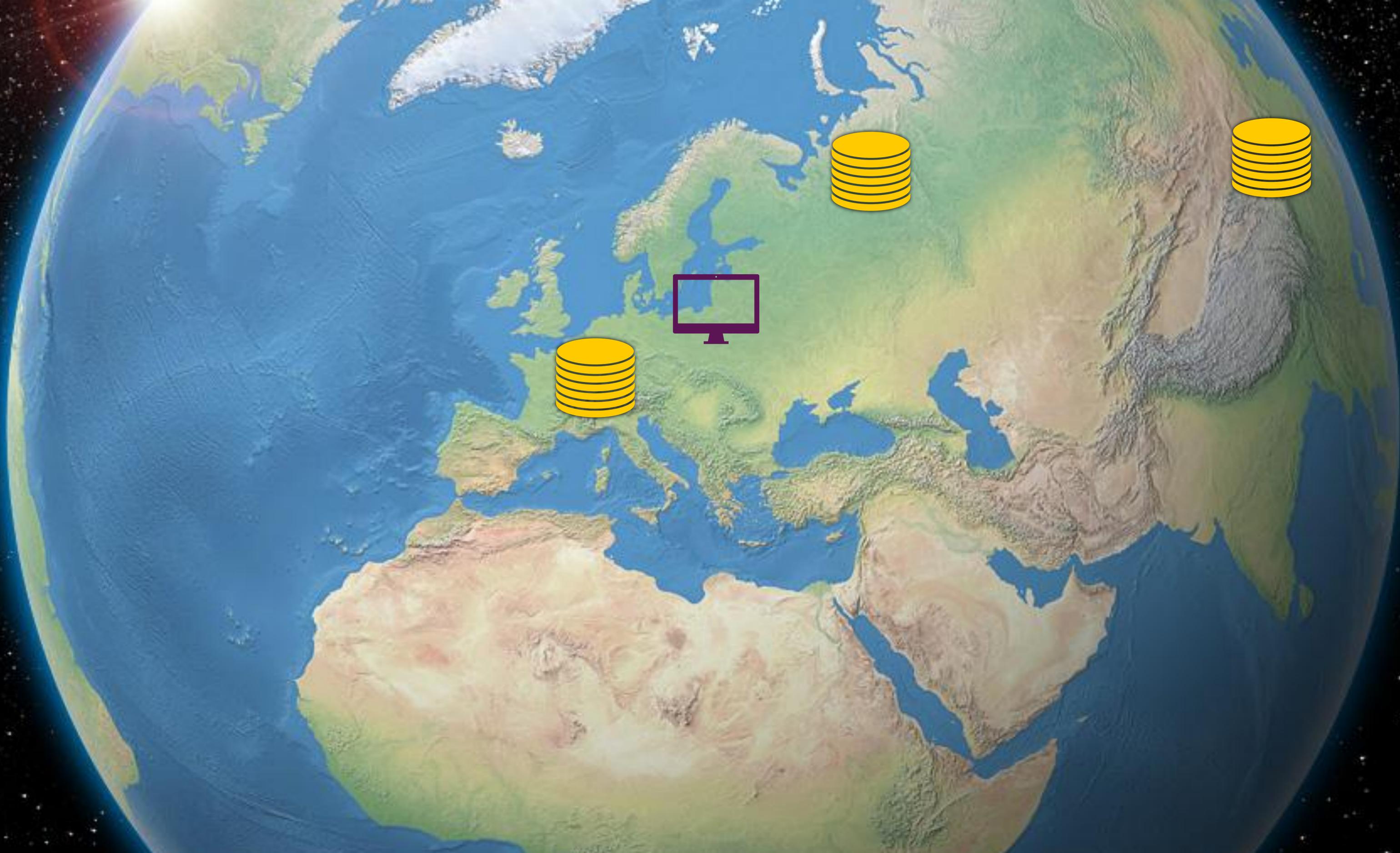
SYN  
Seq = x

SYN+ACK  
Seq = y  
Ack = x+1

ACK  
Seq = y+1  
Ack = x+1



**299 792 458 m/c**

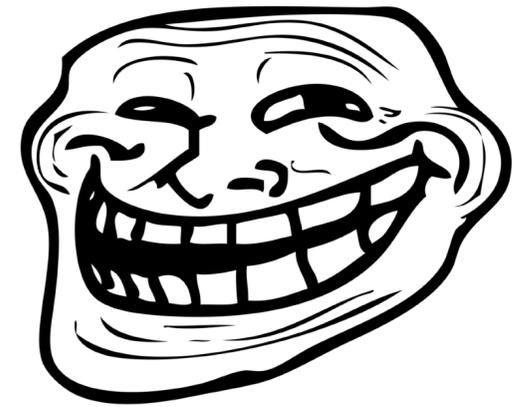


**C**ontent

**D**elivery

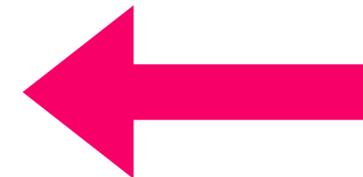
**N**etwork

 **Попросить пользователя  
подъехать ближе к серверу**



# Этапы запроса

1. DNS Lookup и поиск IP-адреса
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**TLS — это про шифрование**

"Hello"

plaintext

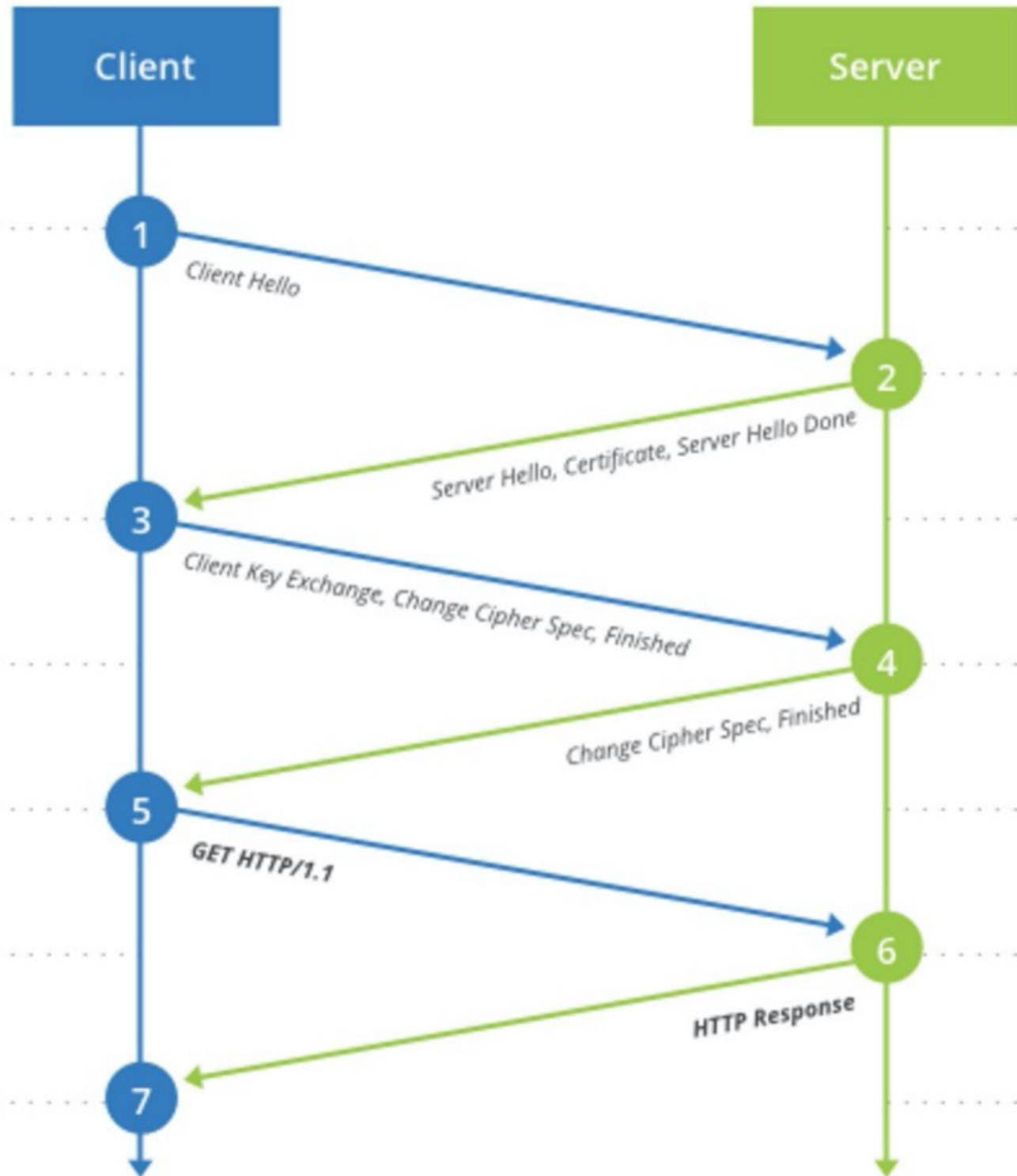
encryption

"SNifgNi+uk0="

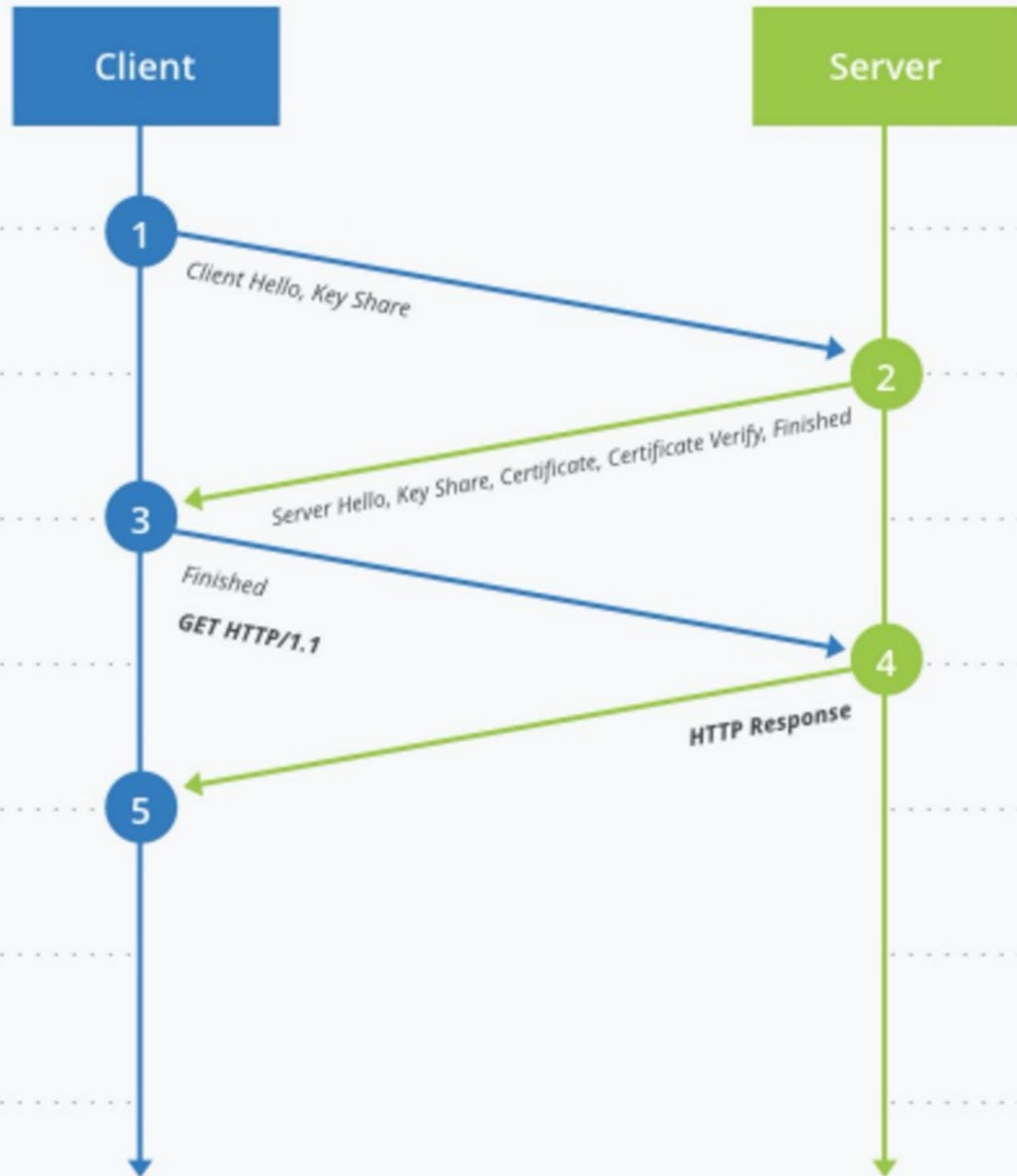
ciphertext



### TLS 1.2 (Full Handshake)



### TLS 1.3 (Full Handshake)



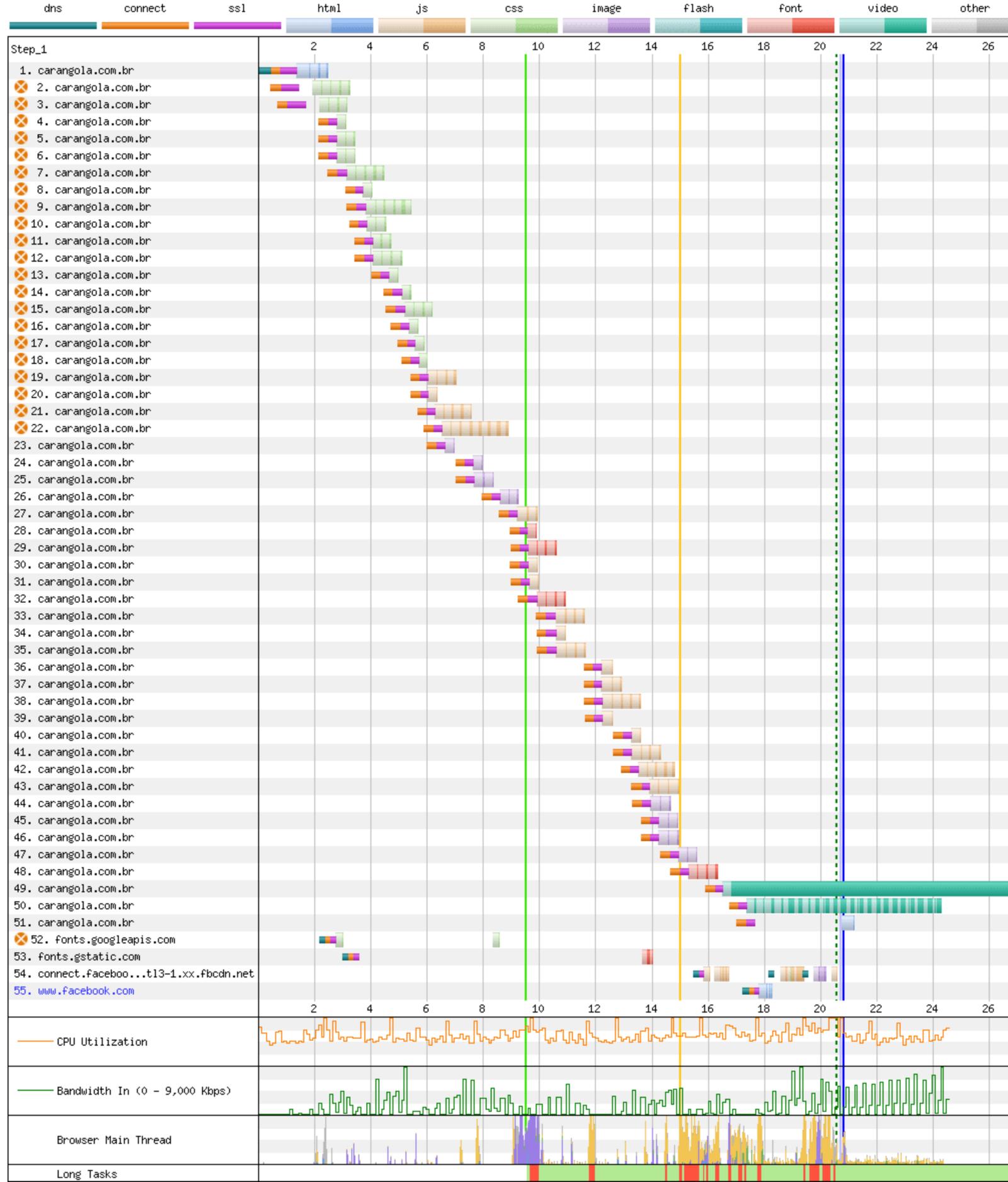


**Обновиться до TLS 1.3**

# Этапы запроса

1. DNS Lookup и поиск IP-адреса
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**Optimising for High Latency Environments**

**HTTP/1.1**

# Head of Line Blocking

6



# Проклятие седьмой вкладки. Неочевидные причины перехода на НТТР 2.0

**Софья Волынская**  
Яндекс Лавка



# Проклятие седьмой вкладки. Неочевидные причины перехода на НТТР 2.0

**Софья Волынская**  
Яндекс ~~Лавка~~ **Контест**



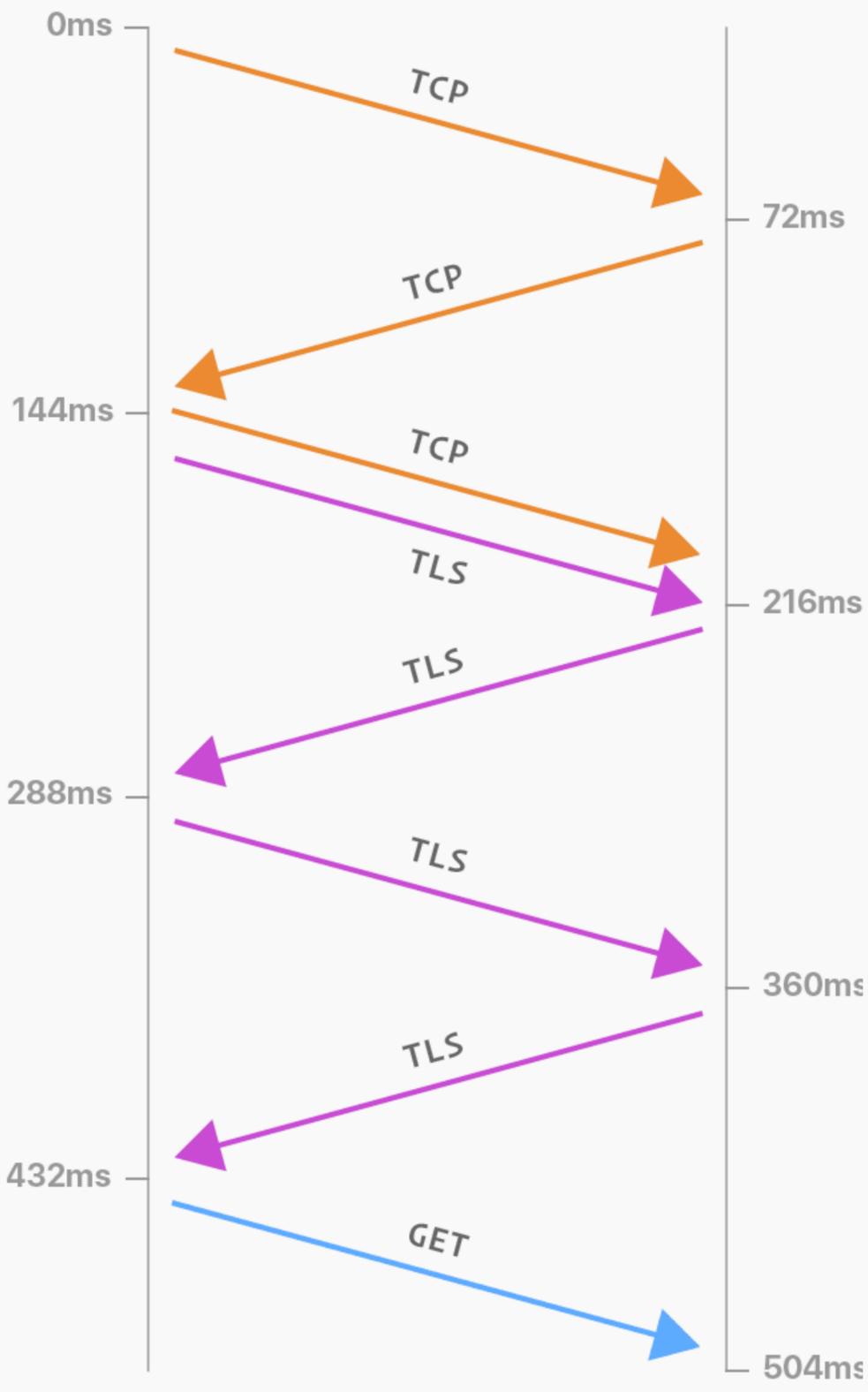
HTTP/1.1



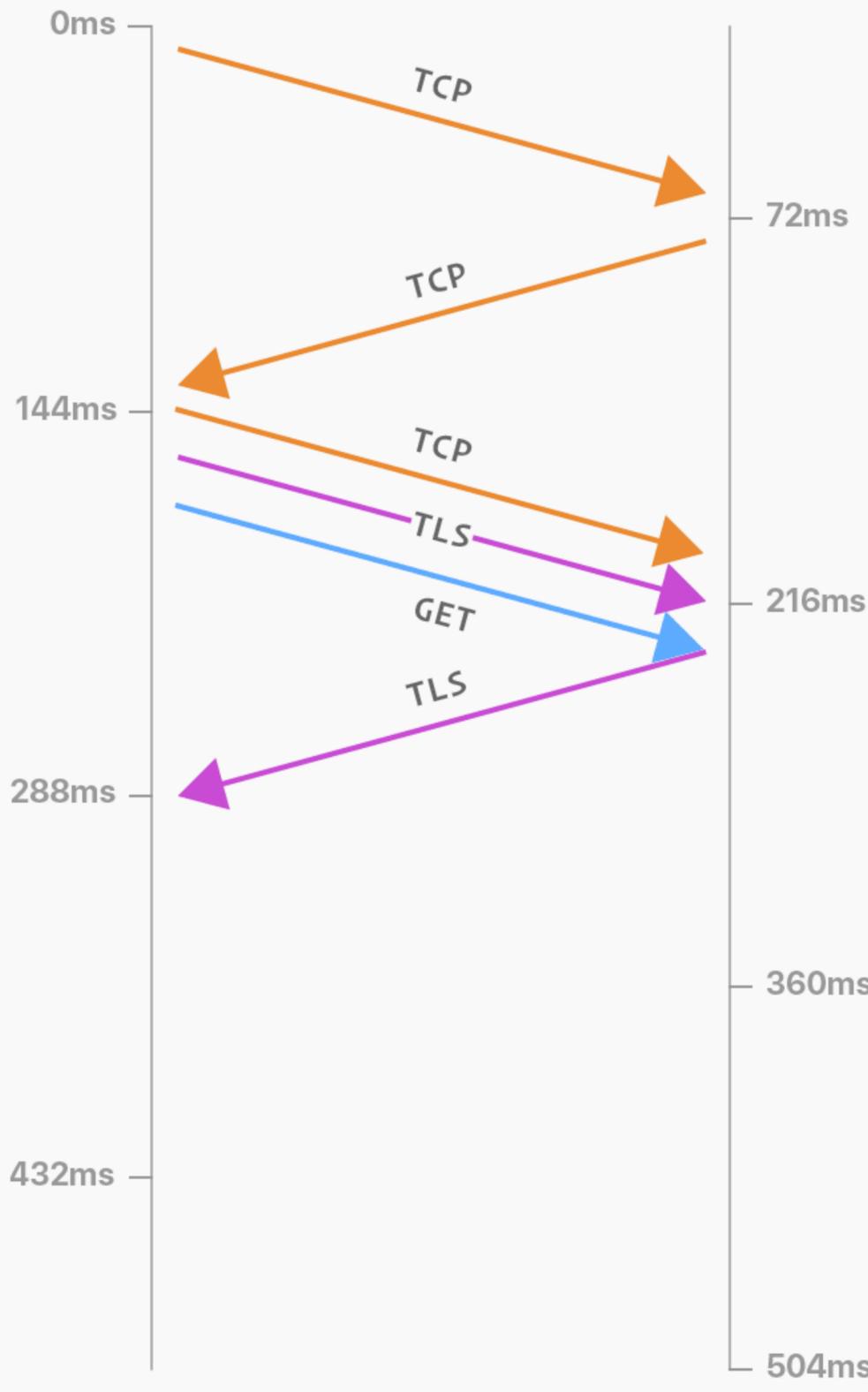
HTTP/2



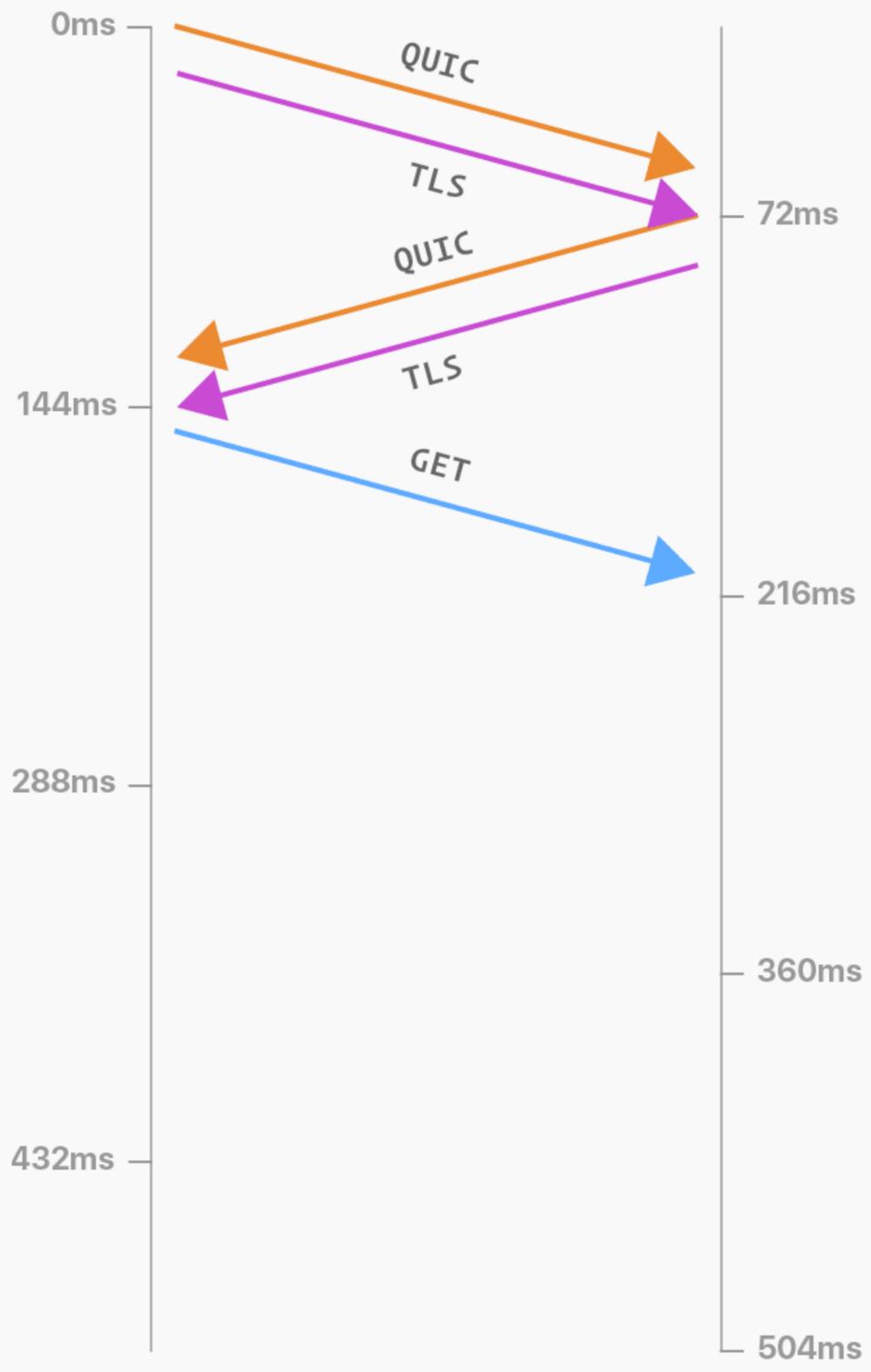
HTTP/1.2 with TLS 1.2



HTTP/1.2 with TLS 1.3+0-RTT



HTTP/3/QUIC





**Включить**

**HTTPR/2 или HTTPR/3**

# Этапы запроса

1. DNS Lookup и поиск IP-адреса
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4. Отправка HTTP-запроса
- 5. Получение ответа сервера** 
6. Обработка ответа сервера



**Уменьшить ответ сервера**



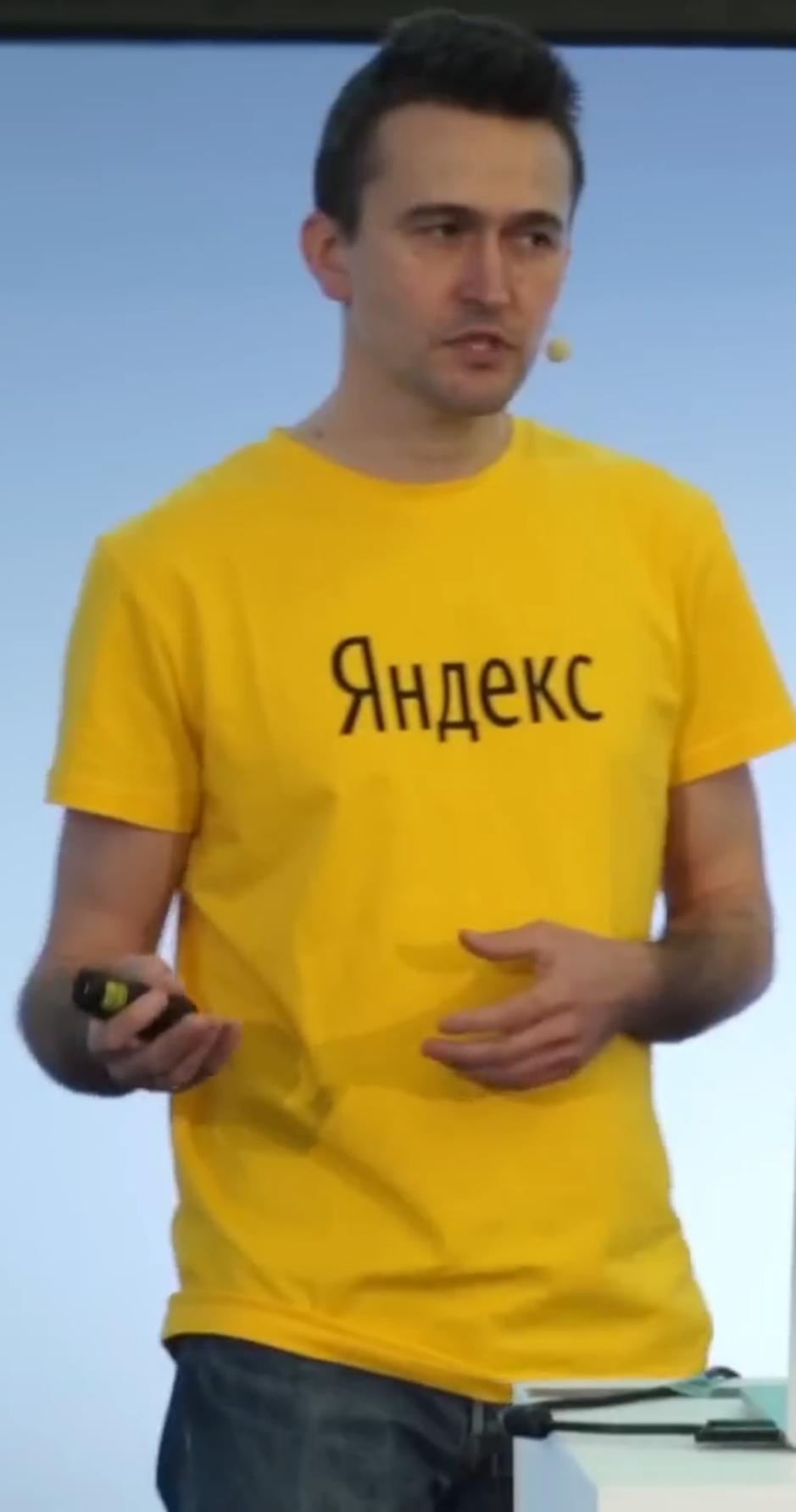
# Стандартные практики

- Минификация кода
- Сжатие через gzip / brotli
- Критический CSS
- <picture> с правильными форматами изображений
- WOFF2-шрифты
- Инлайн-base64

**14 КБ**



**14 КБ**



**T**ransmission

**C**ontrol

**P**rotocol

Network Working Group  
Request for Comments: 5681  
Obsoletes: [2581](#)  
Category: Standards Track

M. Allman  
V. Paxson  
ICSI  
E. Blanton  
Purdue University  
September 2009

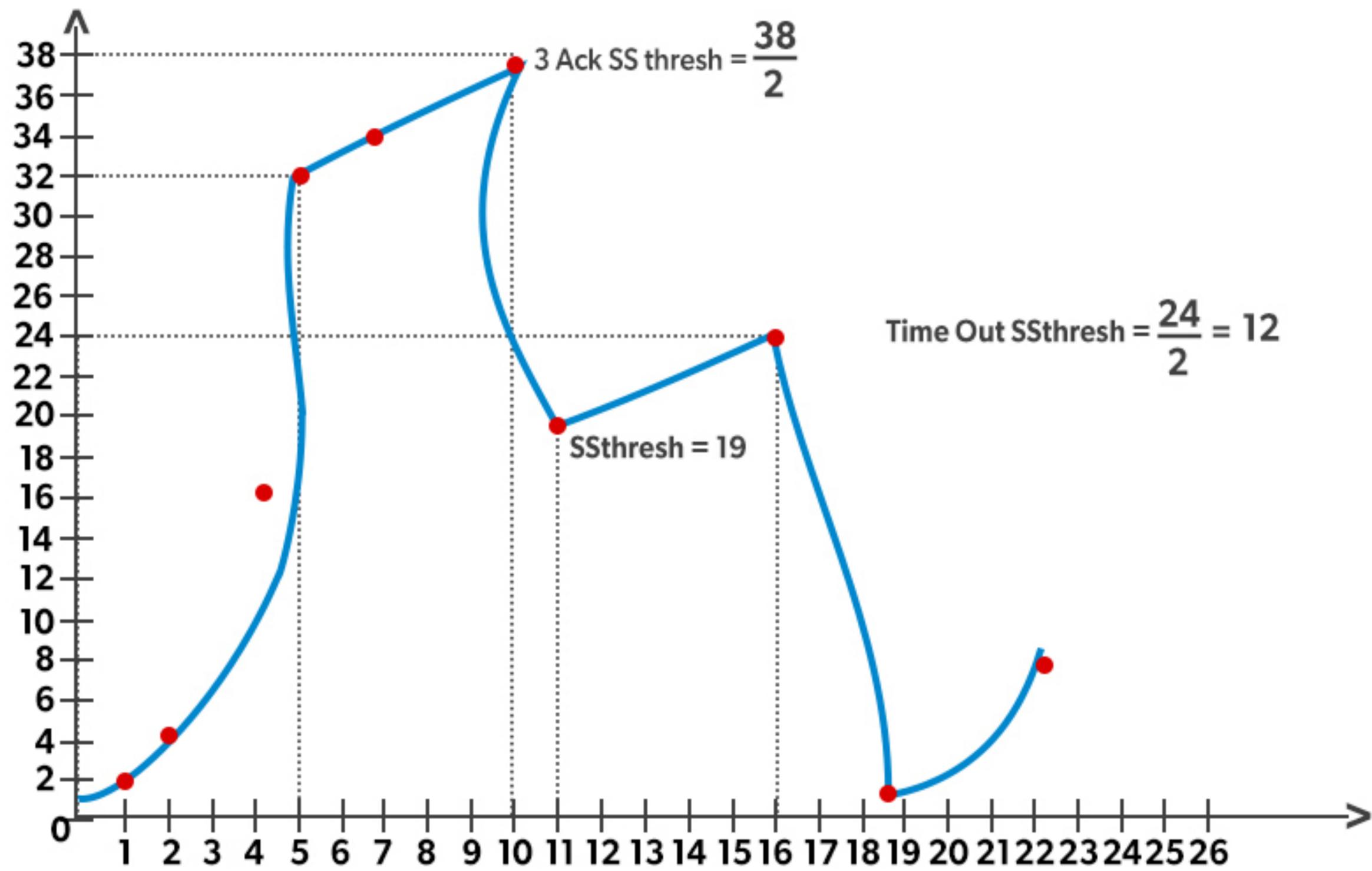
## TCP Congestion Control

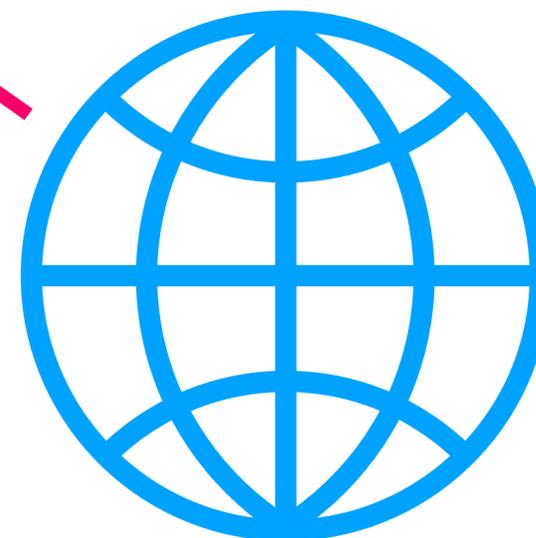
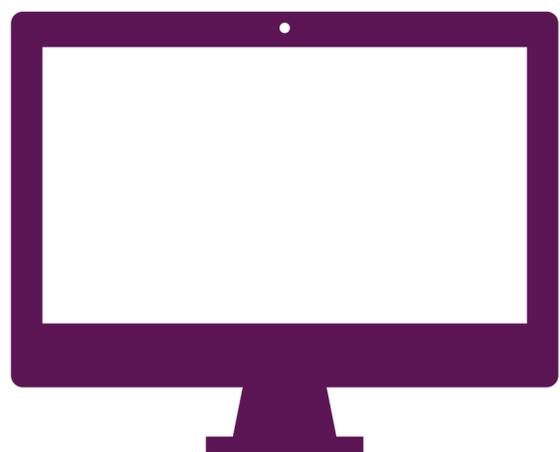
### Abstract

This document defines TCP's four intertwined congestion control algorithms: slow start, congestion avoidance, fast retransmit, and fast recovery. In addition, the document specifies how TCP should begin transmission after a relatively long idle period, as well as discussing various acknowledgment generation methods. This document obsoletes [RFC 2581](#).

### Status of This Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.





**TCP packet = (1460 + 40) bytes**

<b>Round Trips</b>	<b>TCP Capacity (KB)</b>	<b>Cumulative Transfer (KB)</b>
1	14	14
2	28	42
3	56	98
4	112	210
5	224	434
6	448	882
7	896	1,778
8	1,792	3,570
9	3,584	7,154
10	7,168	14,322

 **Упаковать первый экран  
в первые 10 TCP-пакетов**





**Оставить только нужное**

mefody.dev

Chunks

Weekly Links

Talks

# Dev Tips

Hello, my name is Nikita and I am a front-end developer. Here are life hacks and tips related to my daily work.

---

## Weekly Links: 10 February 2024

February 10, 2024 · 1 min to read · #weekly

## A CSS editor written in CSS

February 8, 2024 · 3 min to read · #html #css

## Weekly Links: 03 February 2024

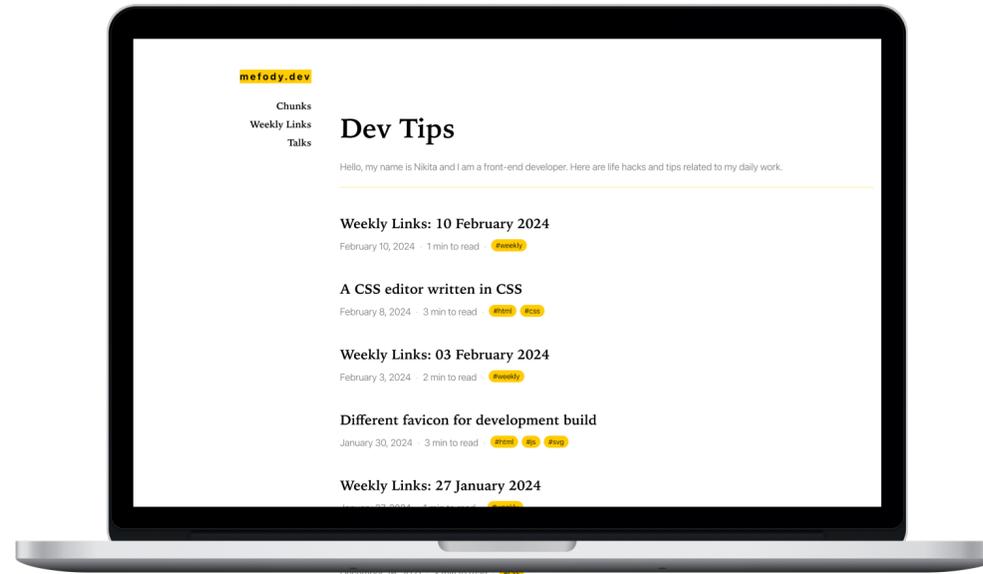
February 3, 2024 · 2 min to read · #weekly

## Different favicon for development build

January 30, 2024 · 3 min to read · #html #js #svg

## Weekly Links: 27 January 2024

January 27, 2024 · 1 min to read · #weekly



meiody.dev

Chunks  
Weekly Links  
Talks

# Dev Tips

Hello, my name is Nikita and I am a front-end developer. Here are life hacks and tips related to my daily work.

## Weekly Links: 10 February 2024

February 10, 2024 · 1 min to read · #weekly

## A CSS editor written in CSS

February 8, 2024 · 3 min to read · #css #css

## Weekly Links: 03 February 2024

February 3, 2024 · 2 min to read · #weekly

## Different favicon for development build

January 30, 2024 · 3 min to read · #css #js #css

## Weekly Links: 27 January 2024

January 27, 2024 · 3 min to read · #css

December 26, 2021 · 3 min to read · #css

## Inspect the ninja element available on hover or focus

December 9, 2021 · 2 min to read · #a11y #a11y

## Accessible components from scratch

November 15, 2021 · 5 min to read · #a11y #a11y

## Prevent text glyphs from turning into emojis

September 19, 2021 · 3 min to read · #css #css

## Tell about the website creators using humans.txt

August 21, 2021 · 2 min to read · #css #css

## Git Hooks: share with your team

August 15, 2021 · 3 min to read · #git #git #git

## Git Hooks: let the machine do all the routine

July 27, 2021 · 5 min to read · #git #git #git

## Change the form control color with accent-color property

July 2, 2021 · 3 min to read · #css

## Link to download

June 17, 2021 · 3 min to read · #css #css

## Set the width of the tab character

May 26, 2021 · 3 min to read · #css

## Work with cookies the modern way

May 1, 2021 · 5 min to read · #js

## How to copy part of a long link text

April 8, 2021 · 1 min to read · #browser

## Social media buttons without JavaScript

April 5, 2021 · 2 min to read · #css

## GitHub from CLI

March 31, 2021 · 3 min to read · #bash #git

## Easy video converting for the web

March 28, 2021 · 2 min to read · #bash #css

## Using a browser as WYSIWYG

March 21, 2021 · 2 min to read · #js #browser

Nikita Dubko  
CSS Evangelist  
Tech speaker  
@webstandards\_ru and @webstandards\_en editor

@ Mastodon  
Twitter  
GitHub  
LinkedIn  
RSS

This site is built with [itty](#) and hosted on [Netlify](#). The source code is hosted on [GitHub](#).

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# Шрифты

## How Many Characters are Visible?

After removing all of the metadata from the rendered HTML, there are 144 visible glyphs on the page.

URL	<a href="https://dump-ekb.ru/">https://dump-ekb.ru/</a>
Page Weight	3.69 MB
Font Weight	89 KB
Visible Glyphs	144
<a href="#">+ (show glyphs)</a>	

# glyphhanger

Your web font utility belt. It can subset web fonts. It can show you what unicode-ranges are used on a web site (optionally per font-family). It can also subset web fonts automatically using the unicode-ranges it found. It makes julienne fries.

## Installation

Available on [npm](#).

```
npm install -g glyphhanger
```



**Prerequisite: pyftsubset**

See <https://github.com/fonttools/fonttools>.

```
pip install fonttools
```



```
@font-face {  
  font-family: Roboto;  
  src:  
    url(Roboto-Regular-subset.woff2) format("woff2"),  
    url(Roboto-Regular-subset.zopfli.woff) format("woff");  
  unicode-range: U+20-7E;  
}
```



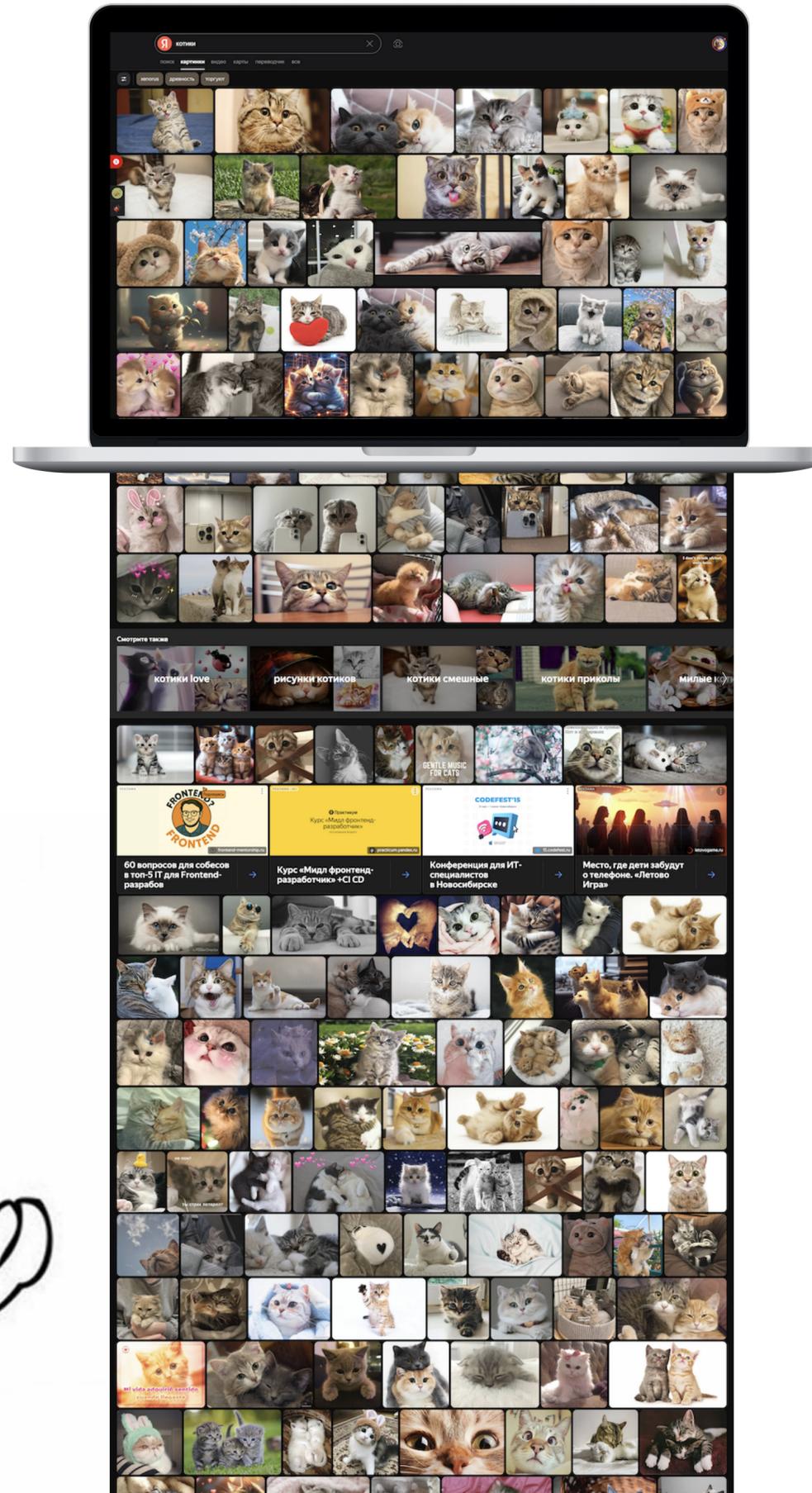
# Modern Font Stacks

```
.text {  
    font-family: system-ui, sans-serif;  
    font-weight: normal;  
}
```

```
.heading {  
    font-family:  
        'Iowan Old Style', 'Palatino Linotype',  
        'URW Palladio L', P052, serif;  
    font-weight: normal;  
}
```



**Ленивая загрузка**



```

```

```
<link rel="stylesheet"  
      href="/another-style.css"  
      media="print"  
      onload="this.media='all'" />
```



Пакет интернета заканчивается. Трафик вне пакета будет стоить 160 руб. за каждые 1 ГБ.

Больше трафика по выгодной цене: [lk.mts.ru/internet](http://lk.mts.ru/internet)

```
<lite-youtube  
  videoid="dQw4w9WgXcQ"  
  playlabel="React free courses">  
</lite-youtube>
```

**OPTIONS**

Access-Control-Max-Age: 600

`npx thanos-js snap-fingers`





**Управлять порядком  
запросов**

```
<head>  
  <link rel="preload"  
        href="flower.avif"  
        as="image"  
        type="image/avif" />  
</head>
```

# 103 Early Hints

```
// Node.js v18.11.0+

const earlyHintsLinks = [
  '</css/style.css>; rel=preload; as=style',
  '</js/script.js>; rel=preload; as=script'
];

res.writeEarlyHints({
  'link': earlyHintsLinks,
});
```

GET /catalog

Host: myshop.com

...

103 Early Hints

Link: </css/style.css>; rel=preload; as=style

Link: </js/script.js>; rel=preload; as=script

...

200 OK

...



```
Presentation.exe
```

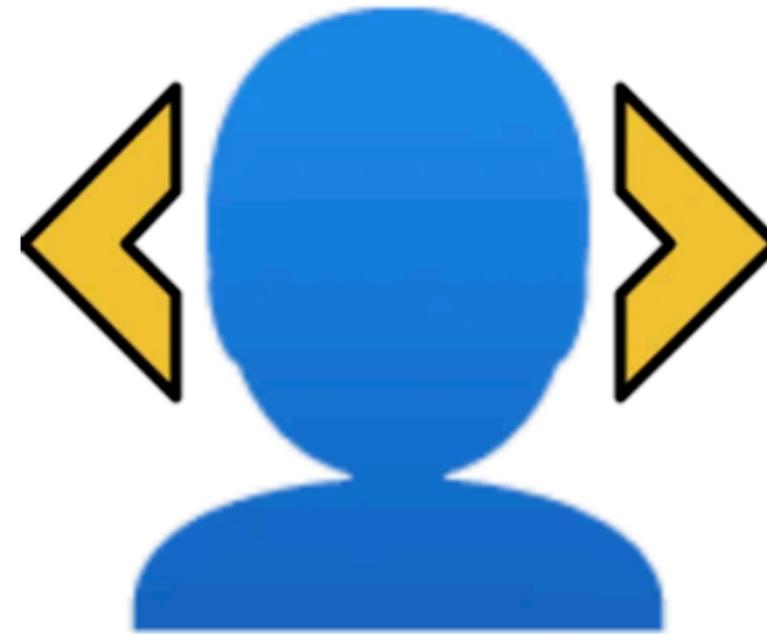
1. `<meta charset|http-equiv|viewport />`
2. `<title>`
3. `preconnect`
4. `<script src="" async></script>`
5. CSS that includes `@import`
6. Synchronous JS
7. Synchronous CSS
8. `preload`
9. `<script src="" defer></script>`
10. `prefetch / prerender`
11. Everything else ('SEO' meta tags, icons, Open Graph, etc.)

# capo.js

Get your <head> in order

Try it live 

Browse the source 



▶ Capo: Actual head order



▼ Capo: Sorted head order



11 <meta charset="utf-8">

11 <meta name="viewport" content="width=device-width,initial-scale=1">

10 <title>Dev Tips</title>

5 ▶ <style>⋮</style>

5 <link rel="stylesheet" href="/styles/styles-bc09e5290d.css">

5 <link rel="stylesheet" href="/styles/dark-e1b132c812.css" media="(prefers-color-scheme:dark)">

# Fetch Priority API

```

```

```
<link rel="preload"  
  href="/js/script.js"  
  as="script"  
  fetchpriority="low">
```

```
<script>  
  fetch('https://example.com/', { priority: 'low' })  
    .then(data => {  
      // Trigger a low priority fetch  
    });  
</script>
```



**Загружать всё с CDN?**

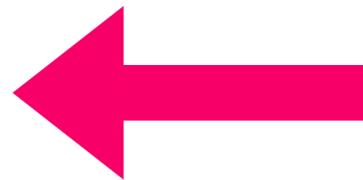
```
<script crossorigin  
    src="https://unpkg.com/react@18/umd/react.production.min.js">  
</script>  
<script crossorigin  
    src="https://unpkg.com/react-dom@18/umd/react-dom.production.min.js">  
</script>
```



 Каждый origin имеет свой  
изолированный кэш

# Этапы запроса

1. DNS Lookup и поиск IP-адреса
2. Соединение с сервером
3. Установка безопасного соединения (TLS/SSL)
4. Отправка HTTP-запроса
5. Получение ответа сервера
- 6. Обработка ответа сервера**





- 1. dump-ekb.ru - /
- 2. fonts.googleapis.com - o
- 3. static.tildac...ge471676
- 4. static.tildac...cards-1.
- 5. static.tildac...-grid-3.
- 6. static.tildac...forms-1.
- 7. static.tildac...ation-2.
- 8. static.tildac...ery-1.10
- 9. thb.tildacdn.com - logo-dum
- 10. neo.tildacdn.com...llback-1
- 11. static.tildacdn.com - dump-
- 12. thb.tildacdn.com - zI1Trimg
- 13. thb.tildacdn.com - image.pr
- 14. thb.tildacdn.com - tg.png
- 15. static.tildacdn...scripts-3
- 16. static.tildacdn...page47167
- 17. static.tildacdn...azyload-1
- 18. static.tildacdn...imation-2
- 19. static.tildacdn...da-zero-1
- 20. static.tildacdn...a-cards-1
- 21. static.tildacdn.com - hamme
- 22. static.tildacdn...da-feed-1
- 23. static.tildacdn...da-slids-1
- 24. static.tildacdn...a-forms-1
- 25. static.tildacdn...da-menu-1

Request #1
Details
Request
Response
Raw Details
Object
Request Blocking
X

**Host:** dump-ekb.ru  
**IP:** 185.129.100.112  
**Error/Status Code:** 200  
**Priority:** Highest  
**Protocol:** HTTP/2  
**HTTP/2 Stream:** 1, weight 256, depends on 0, EXCLUSIVE  
**Request ID:** CB0D1BBE5B50BBDA0A1288E927F63F53

**Timing**

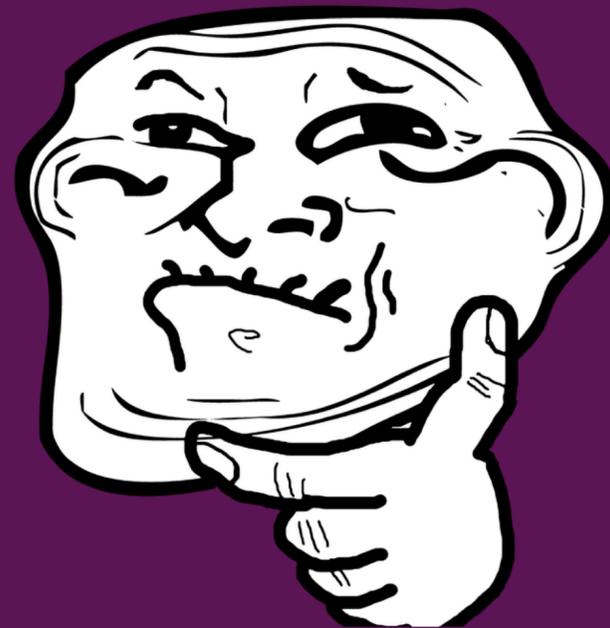
**Discovered:** 0.007 s  
**Request Start:** 0.954 s  
**DNS Lookup:** 429 ms  
**Initial Connection:** 256 ms  
**SSL Negotiation:** 266 ms  
**Total Connection Time:** 951 ms  
**Time to First Byte:** 291 ms  
**Content Download:** 344 ms  
**CPU Time:** 573 ms

# Samsung Galaxy A51 vs iPhone 15 Pro

	Samsung Galaxy A51	iPhone 15 Pro	Difference
<b>Single-Core Score</b>	368	2878	12.8%
Samsung Galaxy A51			
iPhone 15 Pro			
<b>Multi-Core Score</b>	1157	7145	16.2%
Samsung Galaxy A51			
iPhone 15 Pro			
	Geekbench 6.0.0	Geekbench 6.2.2 Corporate	

**TODO:** Подготовить  
отдельный доклад

Если пользователь  
не ушёл сразу



 **Кэшировать**  
**всё кэшируемое**

Cache-Control: public, max-age=31536000

7 March, 2025

# Why Do We Have a Cache-Control Request Header?



**Сервис-воркеры**



**Workbox**

```
runtimeCaching: [  
  {  
    urlPattern: /\.(?:png|jpg|avif|svg)$/,  
    handler: "CacheFirst",  
    options: {  
      cacheName: "images",  
      expiration: { maxEntries: 30 },  
    },  
  },  
  {  
    urlPattern: /(?:\.(?:html))|(\//)$/,  
    handler: "NetworkFirst",  
    options: {  
      cacheName: "articles",  
      expiration: { maxEntries: 20 },  
    },  
  },  
]
```



# Back/Forward Cache





## Где уже есть bfcache



Firefox



Safari



IE 11



UCBrowser 11-12/Android





# **BFSCache: как мгновенно загрузить предыдущую страницу**



**Илья  
Сидорчик**

Яндекс Маркет



**Никогда не используйте  
событие `unload`**





# Shared Compression Dictionaries

# Stand-alone compression

```
function a() {  
  console.log("Hello World!");  
}  
  
function b() {  
  console.log("I am here");  
}
```

Original



```
function a() {  
  console.log("Hello World!");  
}  
  
*b&I am here$
```

Compressed

# Dictionary compression

```
function a() {  
  console.log("Hello World!");  
}  
  
function b() {  
  console.log("I am here");  
}
```

Original

```
function () {  
  console.log("");  
}
```

Dictionary

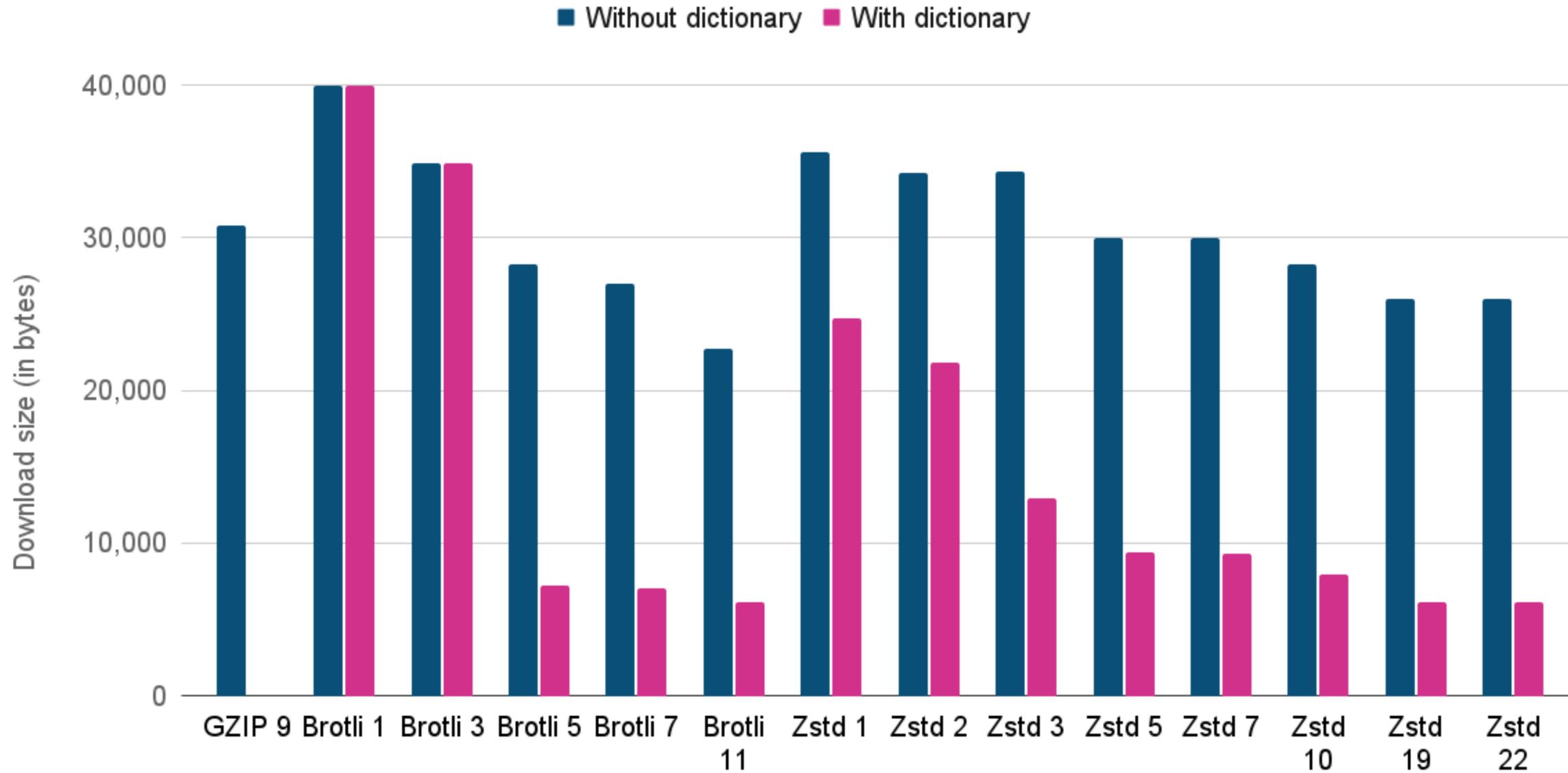


```
*a()&Hello World!$  
*b&I am here$
```

Compressed

# Shared Compression Dictionaries, Delta Compression

*Bootstrap.min.css v5.2.3. used as a compression dictionary for Bootstrap.min.css v5.3.3.*





**Chrome 130+**





# Speculation Rules API

```
<script type="speculationrules">
  {
    "prefetch": [
      {
        "where": {
          "href_matches": " /*"
        },
        "eagerness": "immediate"
      }
    ]
  }
</script>
```

```
<script type="speculationrules">
  {
    "prerender": [
      {
        "where": {
          "href_matches": " /*"
        },
        "eagerness": "moderate"
      }
    ]
  }
</script>
```

# eagerness

- "immediate" — как только, так сразу;
- "eager" — пользователь «дотронулся» до ссылки;
- "moderate" — пользователь задержался на ссылке;
- "conservative" — пользователь начал нажимать на ссылку.

# How Google Search uses speculation rules



Barry Pollard



Oleksiy Busaryev



Published: Feb 12, 2025

Google Search is [one of the most popular sites on the web](#), and also one of the fastest. The Search team is continually investing in making the search experience faster. On a page as popular as Google Search, even milliseconds of improvement quickly add up! That interest in speed includes the well-known Google home page, the Search Engine Results Page (SERP), and clicks to other sites from those search results.

Google Search has been making use of the [Speculation Rules API](#) to improve navigation speed from the search results page to the result links and they've been using a few features of the API that may be of interest to other site owners.

```
{
  "prefetch": [{
    "source": "list",
    "requires": [
      "anonymous-client-ip-when-cross-origin"
    ],
    "referrer_policy": "strict-origin",
    "urls": [
      "https://www.merriam-webster.com/dictionary/test",
      "https://dictionary.cambridge.org/dictionary/english/test"
    ]
  }]
}
```



**Chrome 110+**

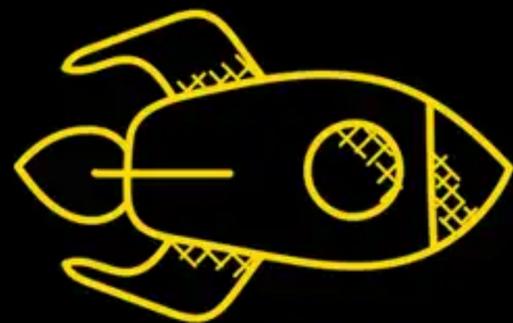
Что дальше?



**csswizardry.com**

# Web Performance 101

Ivan Akulov  
@iamakulov





**Делать онлайн-приложение  
и опираться на наличие Интернета**



**Local First**





## Архитектура LocalFirst для Frontend приложений

Андрей Кобец  
Основатель, Kobezza.Lab



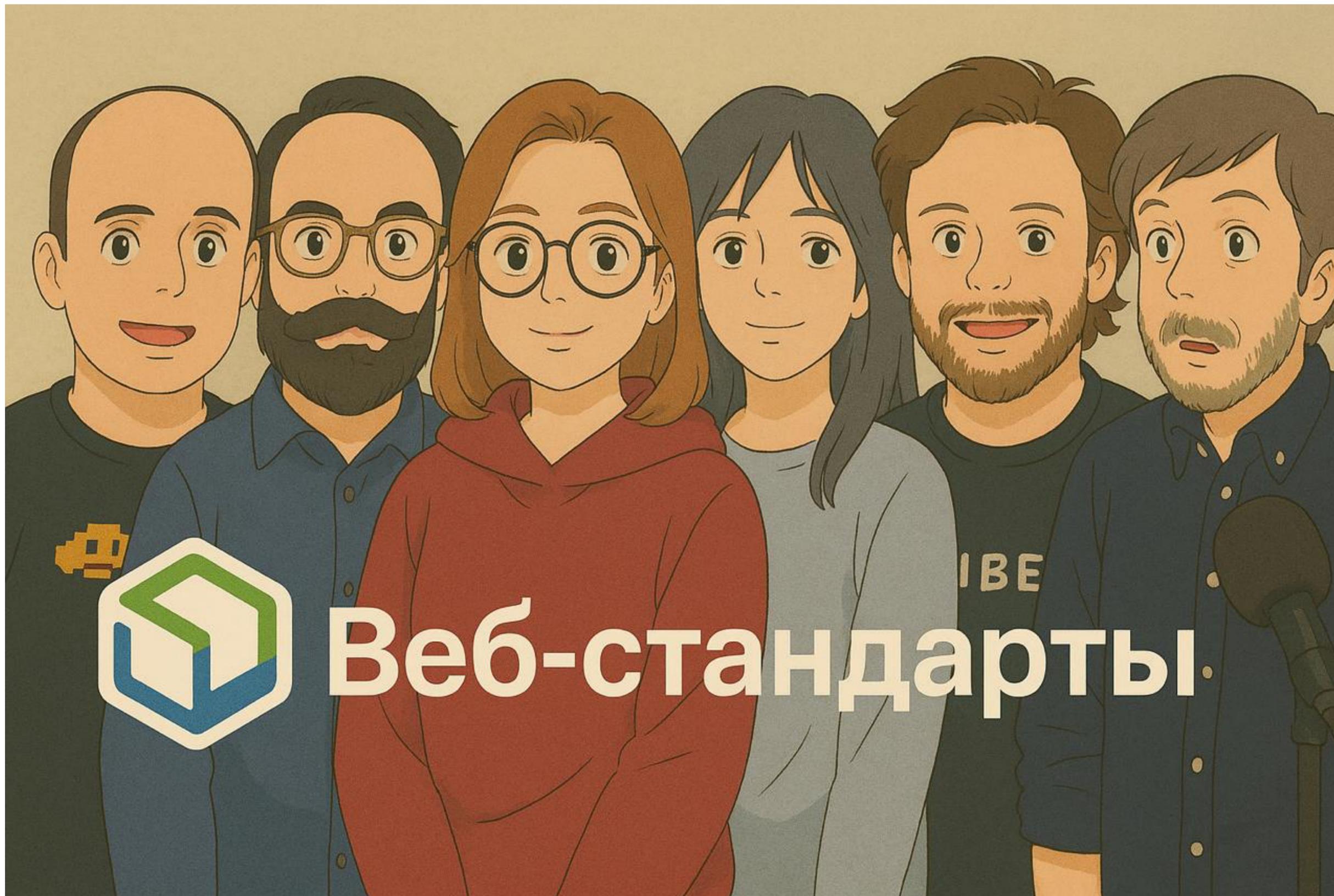
# Cool frontend arts of local-first: storage, sync, conflicts

Blog Post

Frontend

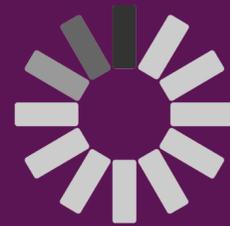
Design





Веб-стандарты.

# Оценить доклад



# Подписаться на автора