

# HTTP 2

Ускорение загрузки с HTTP/2 и веб-серверами нового поколения.

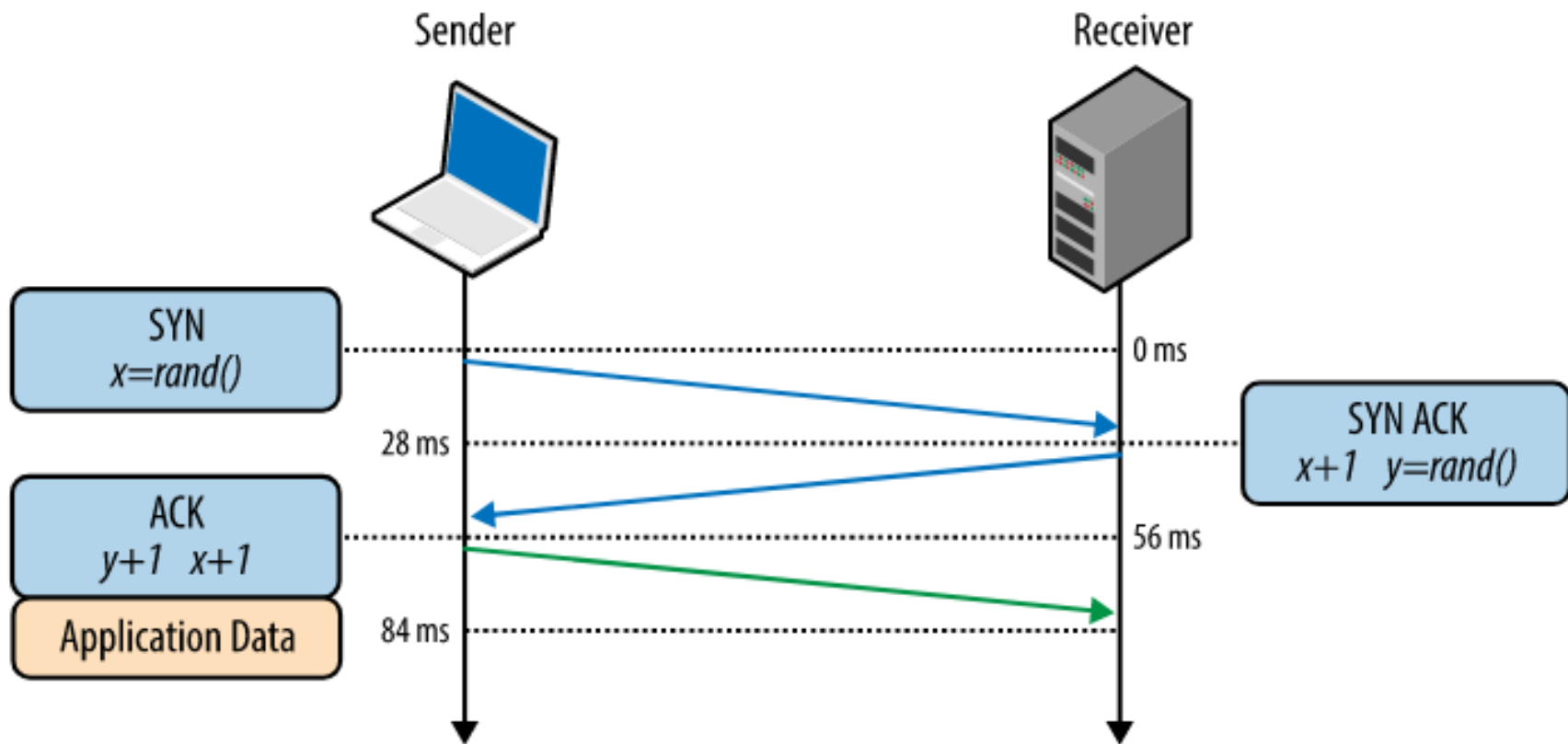
Григорий Кочанов, 2017



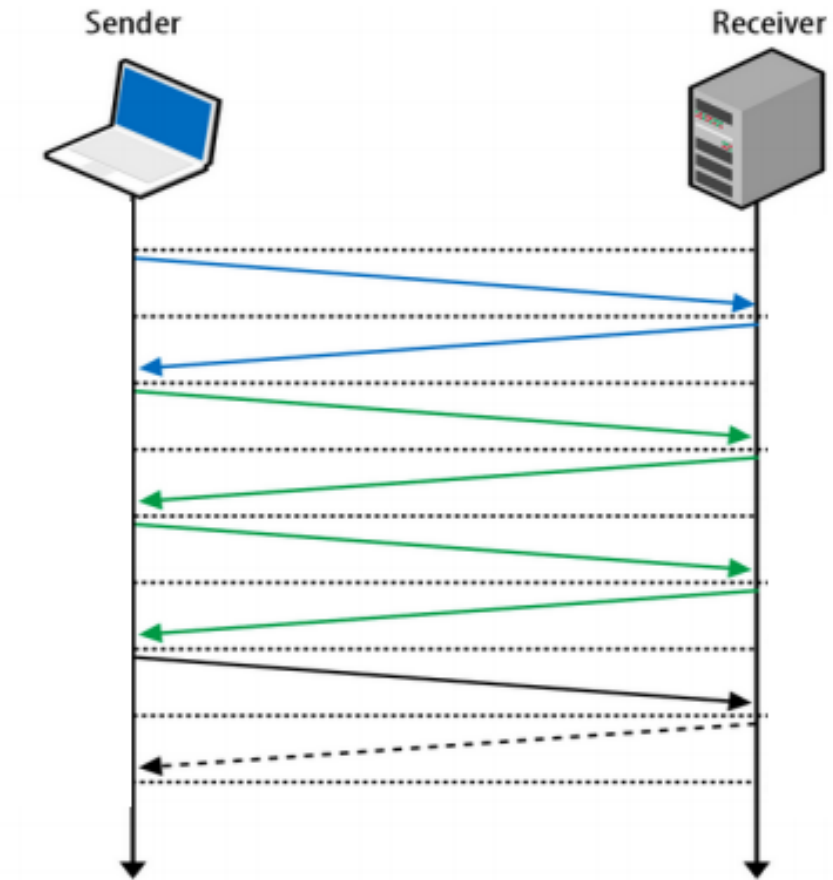
<http://www.devconf.ru>

# HTTP/2, SPDY и QUIC

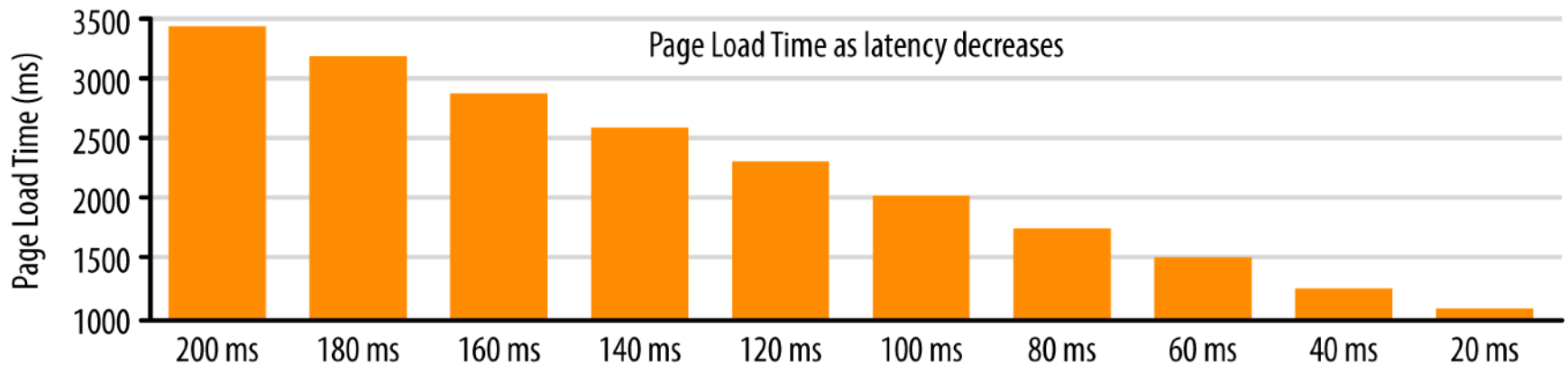
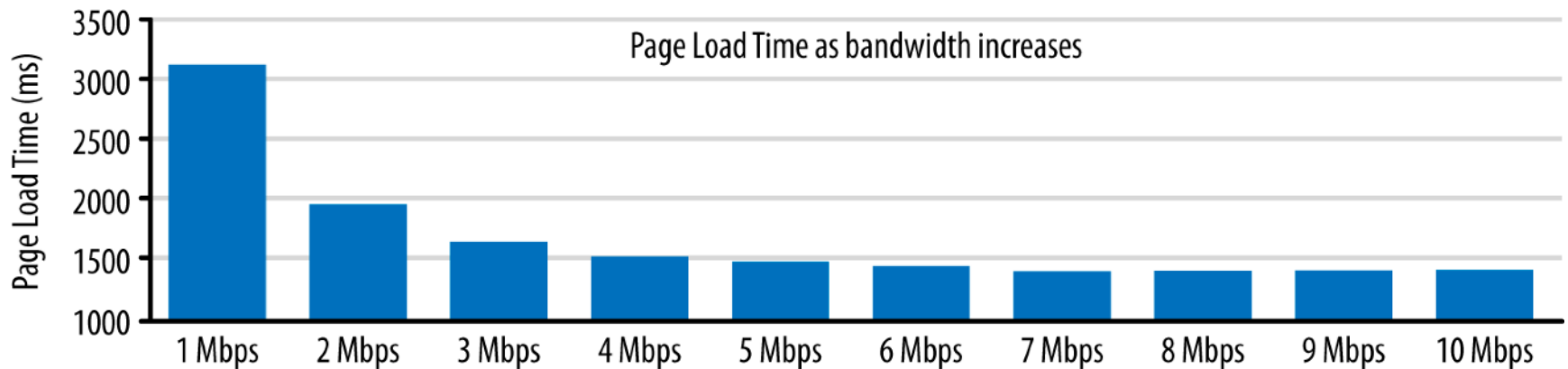
# TCP 3-way handshake



## HTTPS session start



## Bandwidth VS Latency



## SOLUTIONS

- KEEP-ALIVE
- CONTENT COMPILATION
- WEB SOCKETS
- SPDY
- HTTP/2
- QUIC

## HTTP Keep-Alive

Если б мишки были пчёлами, то они бы нипочём, никогда и не подумали, что с keep-alive облом.

“In HTTP/1 74% of our active connections carry just a single transaction - persistent connections just aren't as helpful as we all want. But in HTTP/2 that number plummets to 25%”, - Mozilla Firefox Principal Engineer

## Content merge

- Combining CSS and JS in one file
  - debug, update, deployment, development != production
- data: URL
  - size limit, no cache, base64 overhead
- Image sprites
  - JPEG, manual work
- JS and CSS embedding
  - no cache,

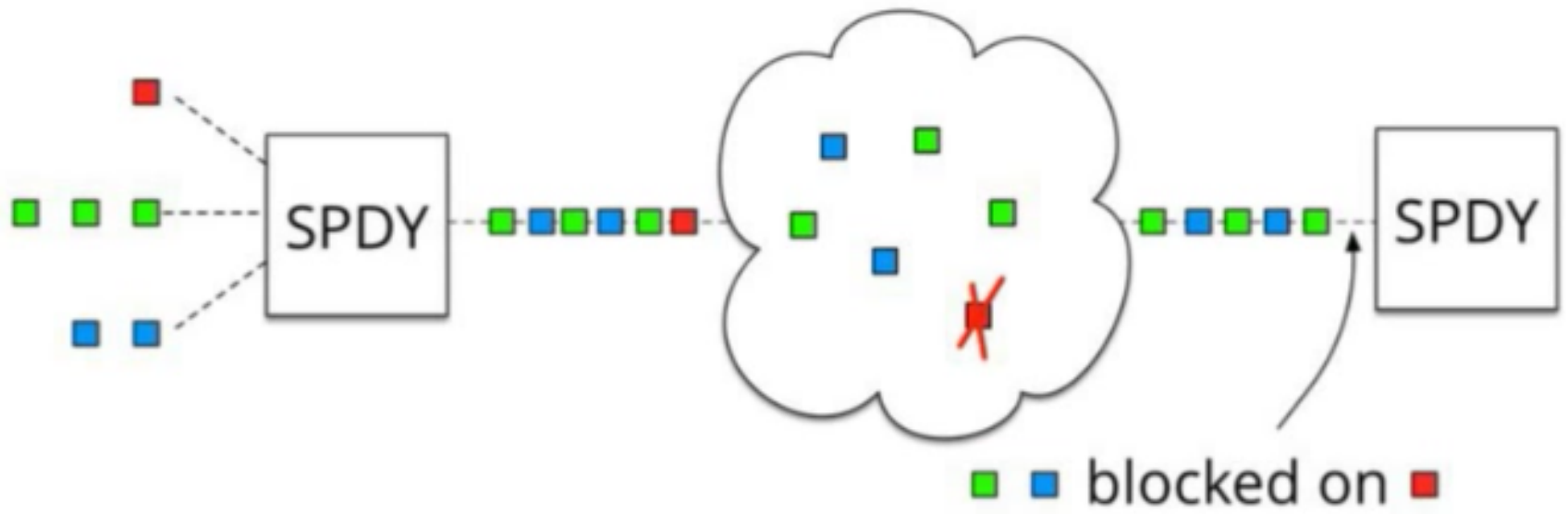


## Web sockets

- Ground-up protocol and application development
- Scalability
- Firewalls and mobile providers
- Starts with HTTP 1

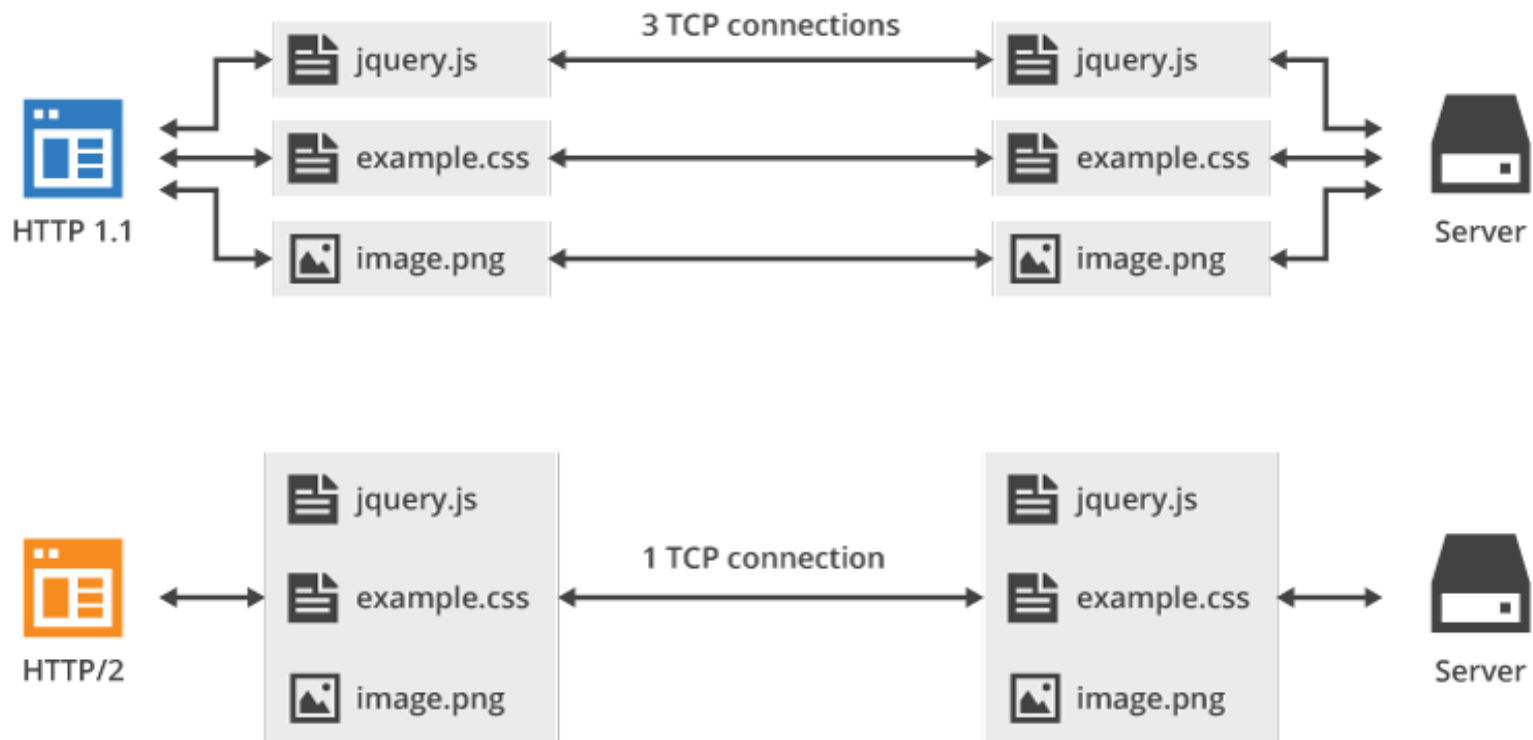
## SPDY

Head-of-line blocking

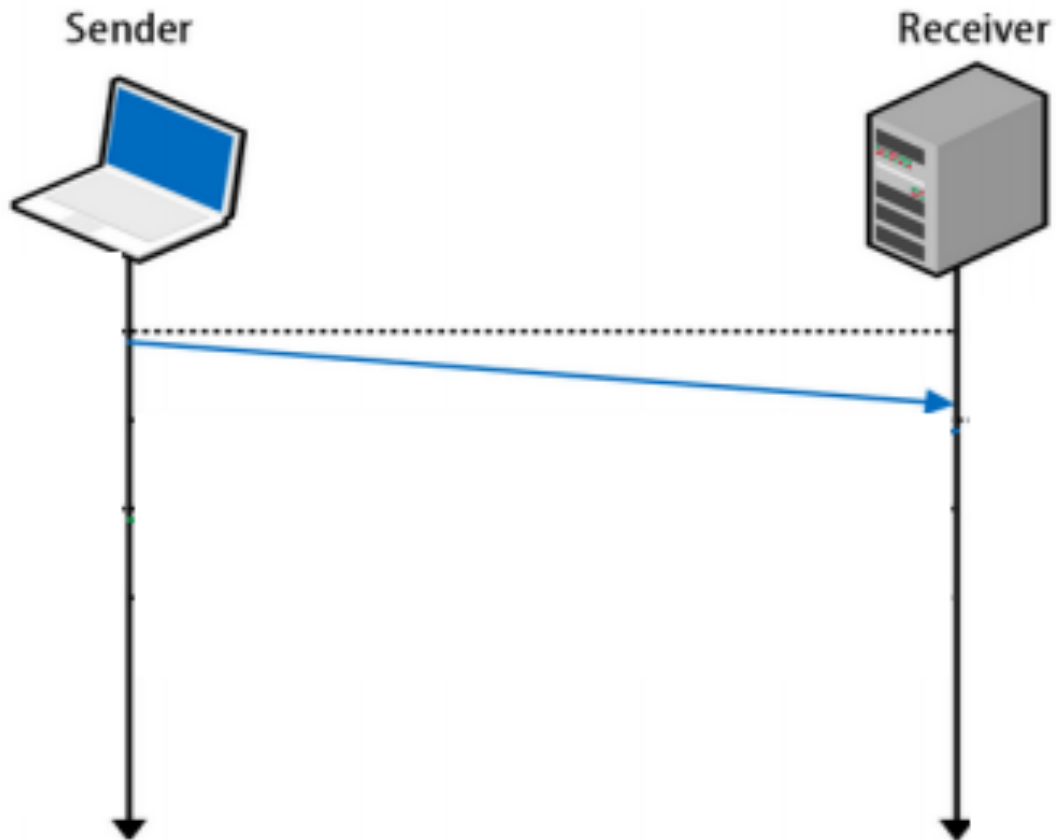


## HTTP/2

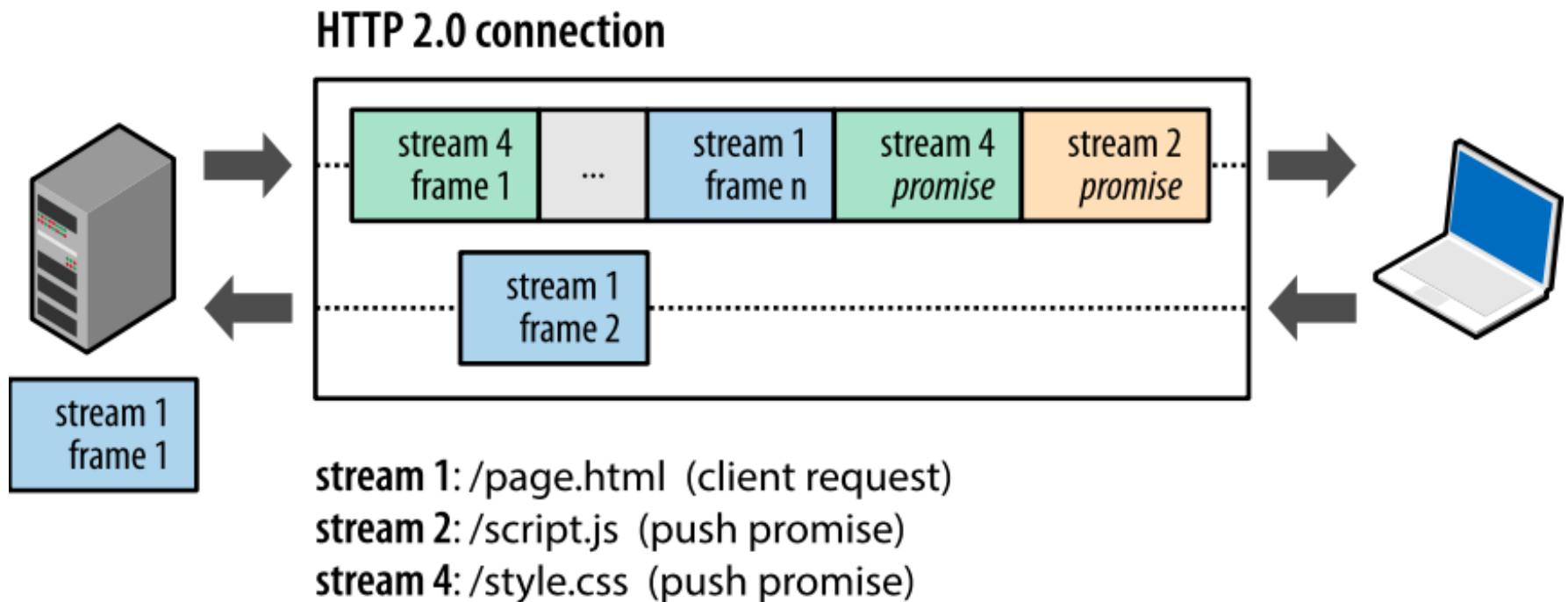
### Multiplexing



## QUIC



# FRAMES, STREAMS and PROMISES



## Traffic prioritization

- Weight-based: Chromium

Type	Weight
HTML	256
CSS	220
script	183
image	110

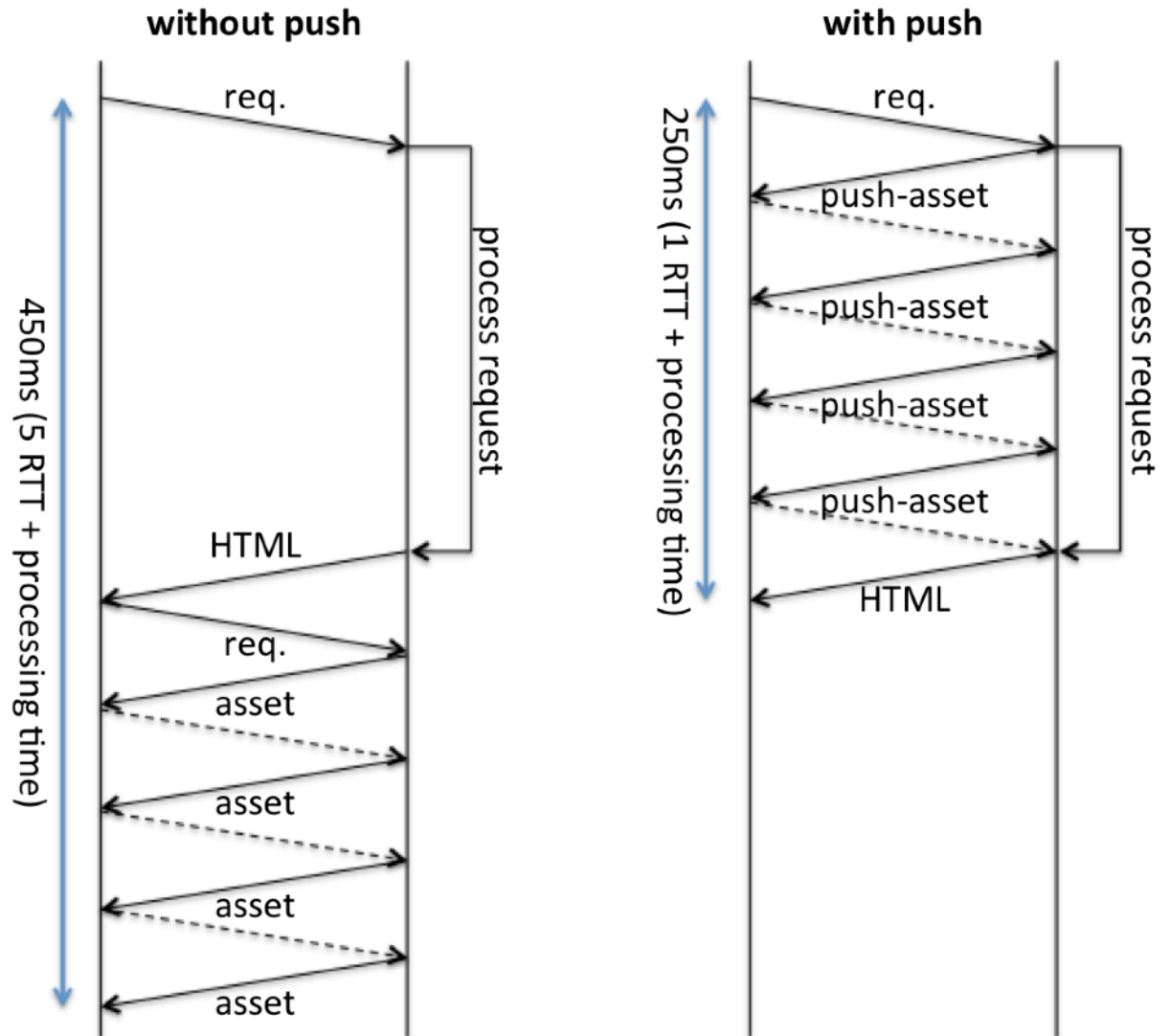
- Dependency-based: Firefox

Initial-paint time is 1.5 times faster

## Server push

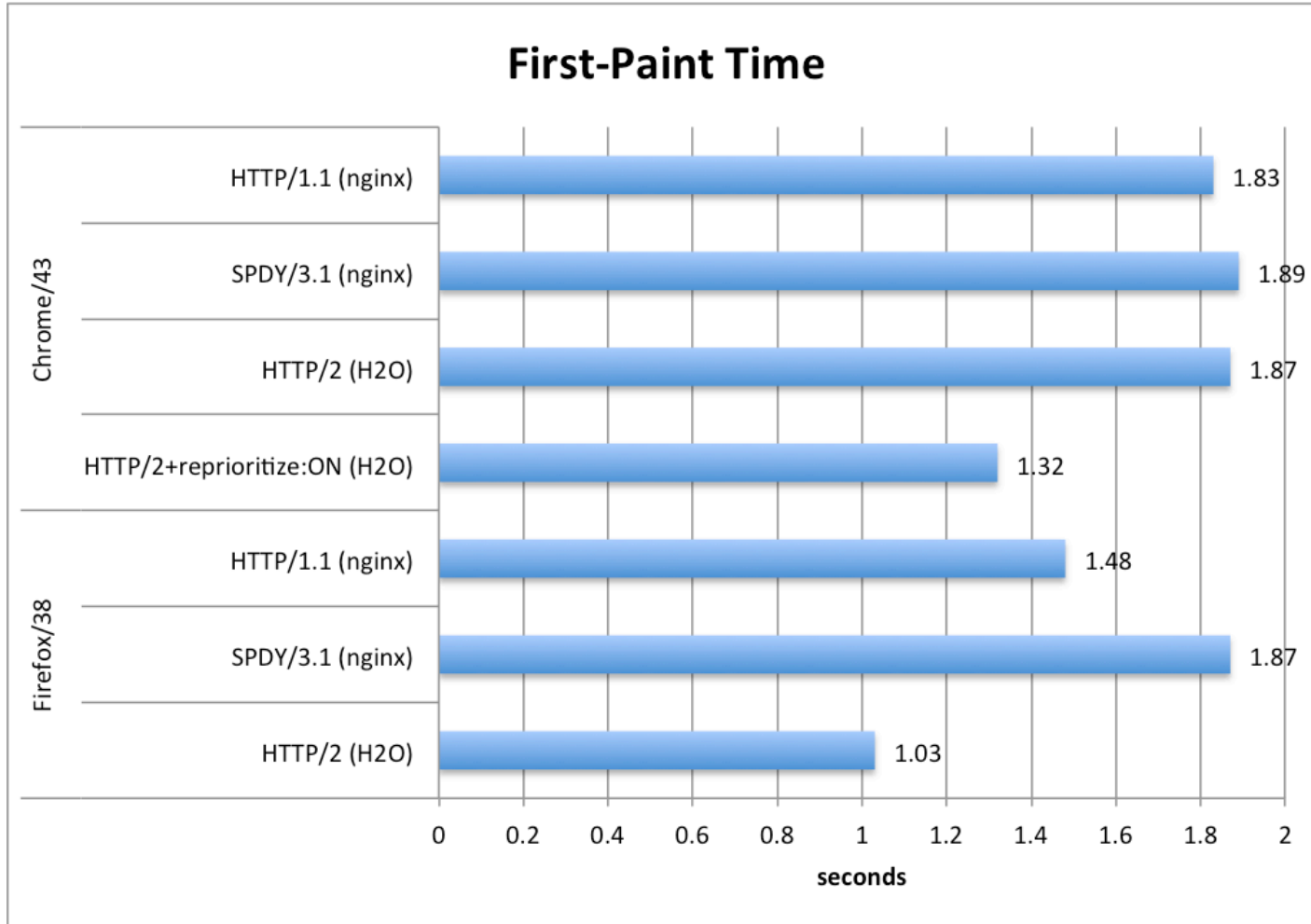


## Server push





# Stream reprioritization



## Reprioritization for Chrome

HTTP/1.1 100 Continue

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

Link: </assets/jquery.js>; rel=preload

HTTP/1.1 200 OK

Content-Type: text/html; charset=utf-8

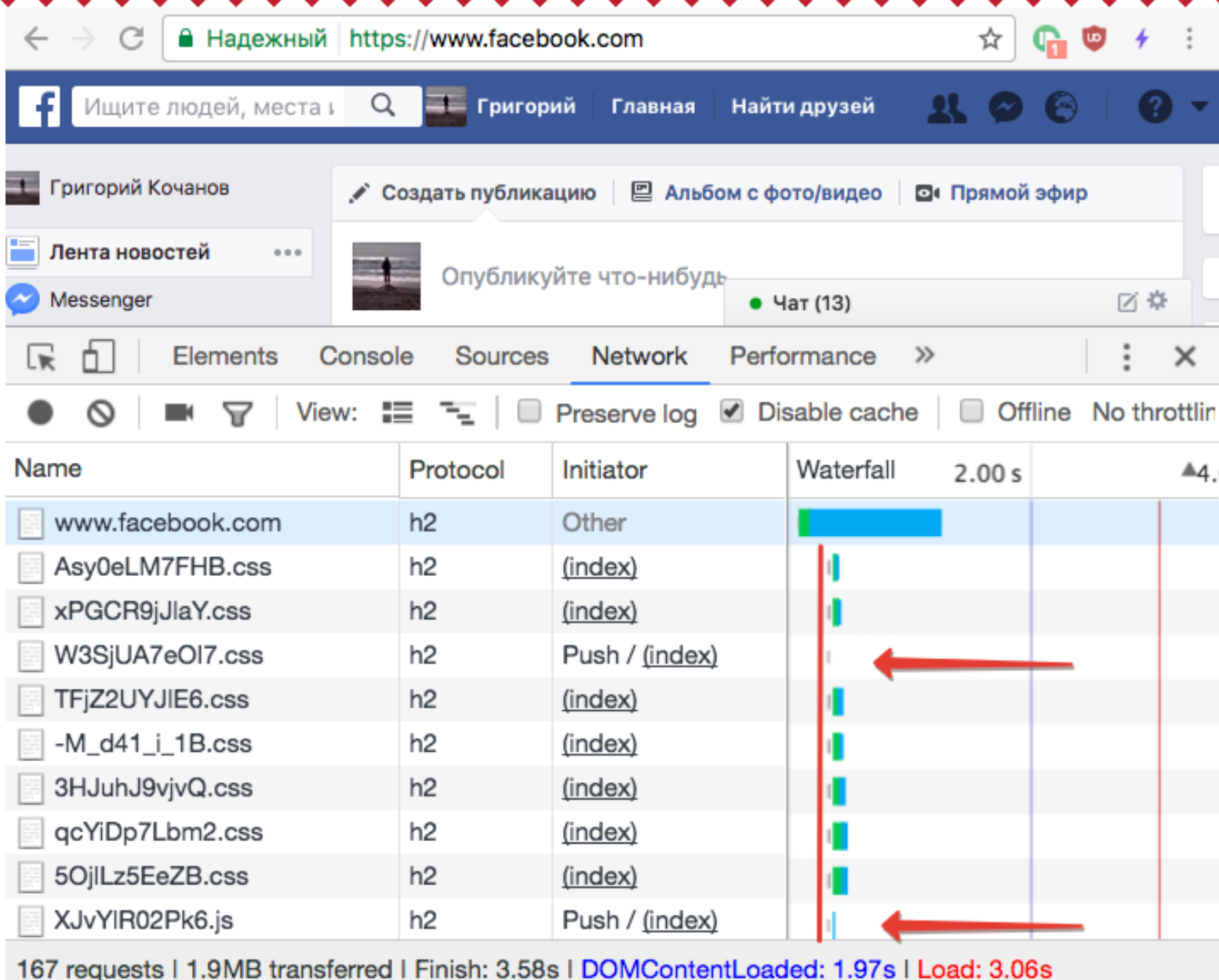
```
<!doctype html>
```

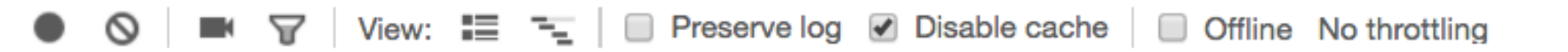
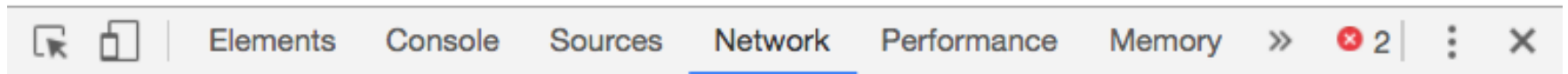
```
<html>
```

```
<head>
```

```
<link rel="stylesheet" type="text/css" href="/assets/style.css">
```

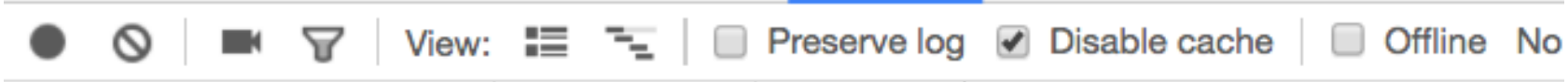
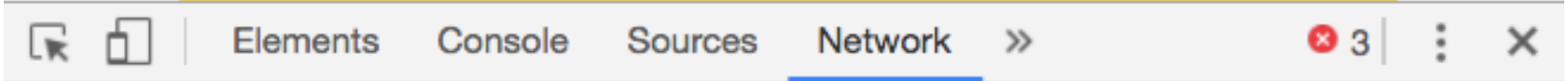
```
<script type="text/javascript" src="/assets/jquery.js"></script>
```





Name	Protocol	Initiator	Waterfall	1.00s
www.google.nl	http/2+quic/36	Other		
googlelogo_color_120x44dp.p...	http/2+quic/36	(index)		
status?continue=https://www...	http/2+quic/36	(index)		
googlelogo_color_272x92dp.p...	http/2+quic/36	(index)		
i1_1967ca6a.png	http/2+quic/36	(index)		
nav_logo242.png	http/2+quic/36	Other		

17 requests | 403KB transferred | Finish: 1.00s | **DOMContentLoaded: 332ms** | **Load: 331ms**

Найти

Name	Protocol	Initiator	Waterfall	
ya.ru	http/1.1	Other		
watch.js		(index)		
jquery.min.js	http/1.1	(index)		
_yaru.ru.js	http/1.1	(index)		
data:image/gif;base...	data	Other		
eS-nxtWWJ1LfBWLfd0...	http/1.1	(index)		

9 requests | 99.3KB transferred | Finish: 312ms | DOMContentLoaded: 291ms | Load: 317ms

**А сегодня, в завтрашний день  
не все могут смотреть.  
Вернее смотреть могут не только  
лишь все, мало кто может  
это делать.**

**(с)Кличко**



## References

<https://http2.github.io/faq/>

<https://developers.google.com/web/fundamentals/performance/http2/>

<https://h2o.example.net>

<https://nghttp2.org>

<https://tools.ietf.org/html/rfc7540>