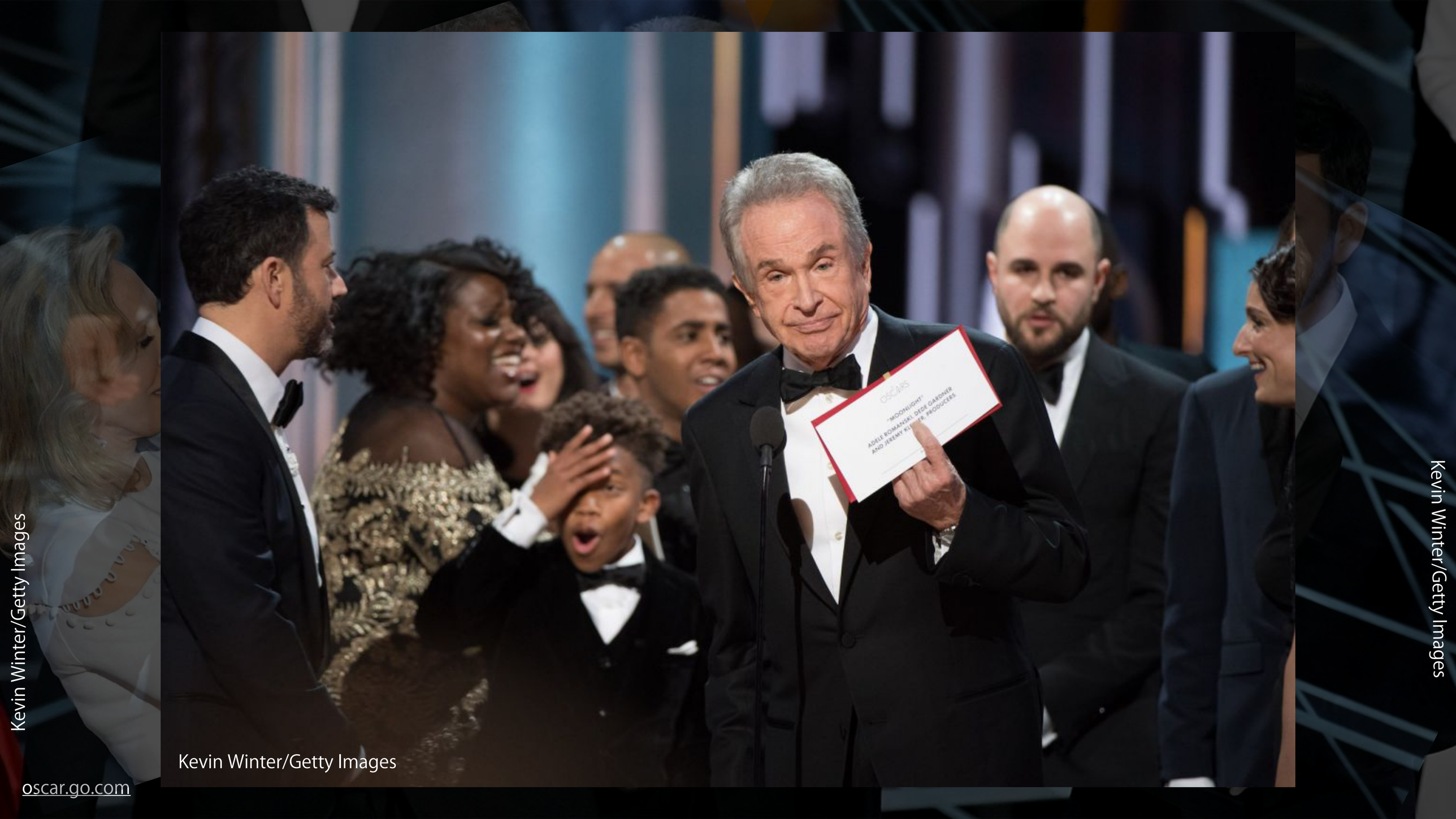
DENYS MISHUNOV • DIGITAL GARDEN AS • @mishunov



Kevin Winter/Getty Images

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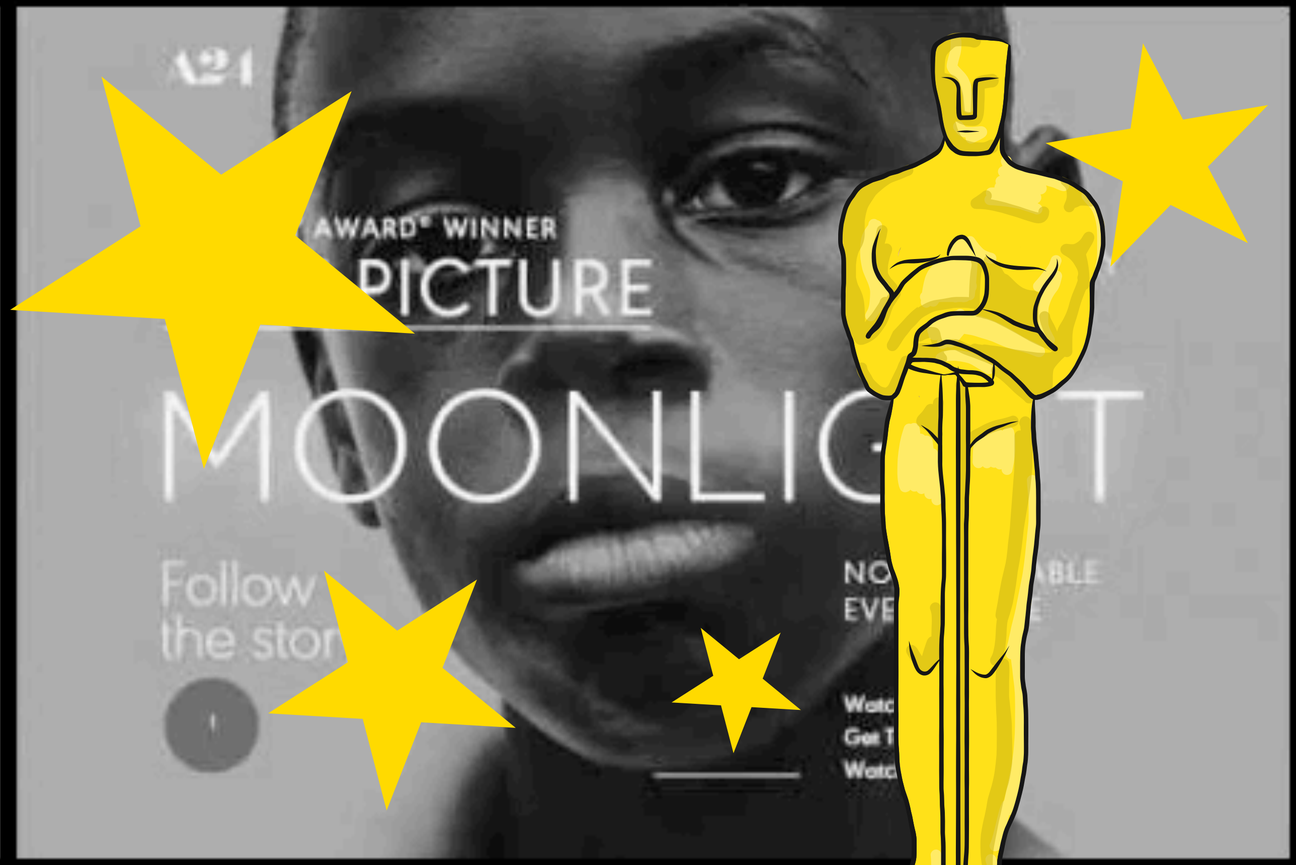
oscar.go.com

lalaland

16.5

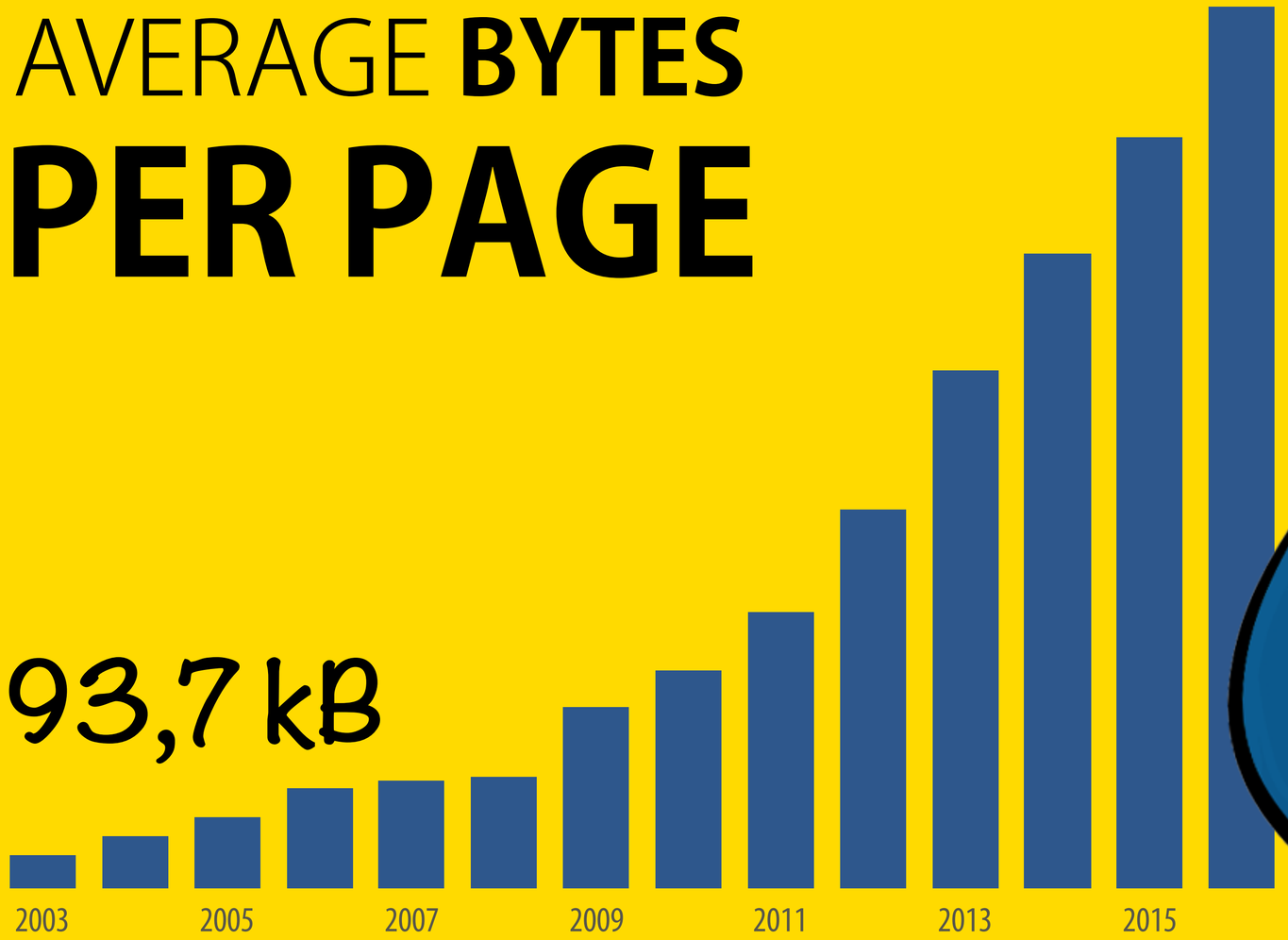
moonlight



13.2

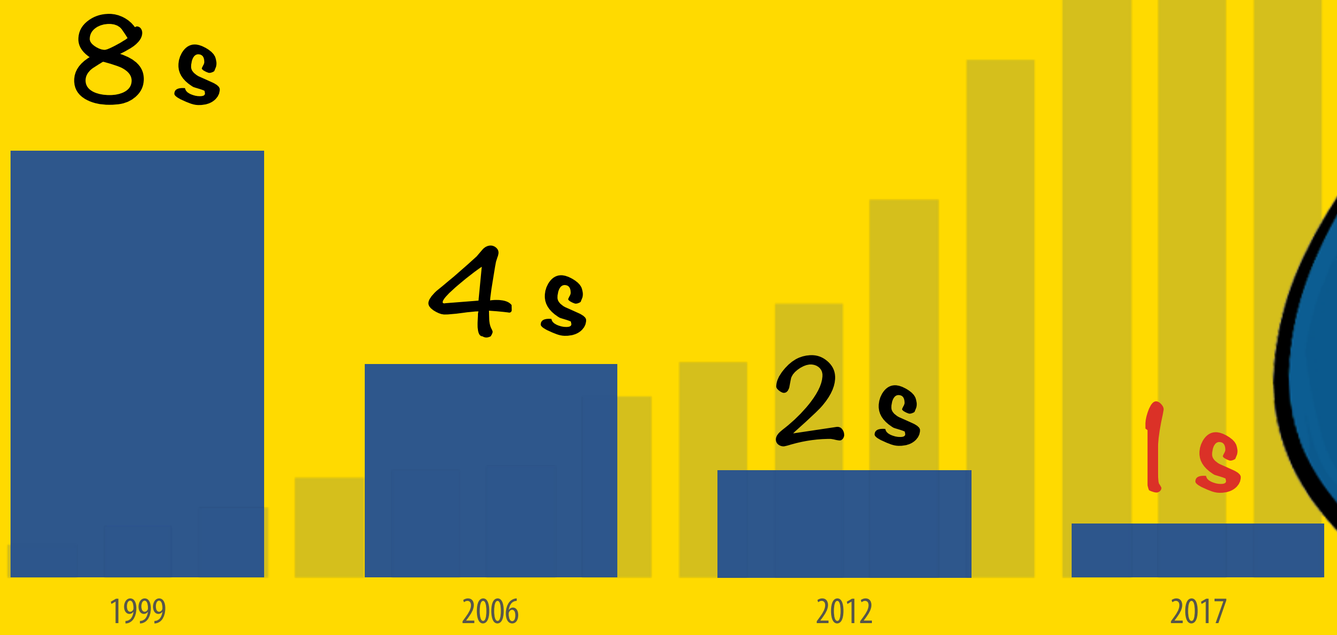
AVERAGE **BYTES**

PER PAGE



http://goo.gl/qjmum

LOADING TIME
EVOLUTION



2569 kB

http://goo.gl/qjmum

Walmart

↓ **1** s

↑ **2%** conv

amazon

↓ **0.1** s

1% revenue

MOBILE TRANSACTIONS SURVEY

Harris Interactive for Tealeaf, 2011

MOBILE TRANSACTIONS
SURVEY

23%
CURSED
at their device

MOBILE TRANSACTIONS
SURVEY

11%

SCREAMED

at their device

MOBILE TRANSACTIONS
SURVEY

4%

THREW

their device

PEOPLE

HATE

WAITING

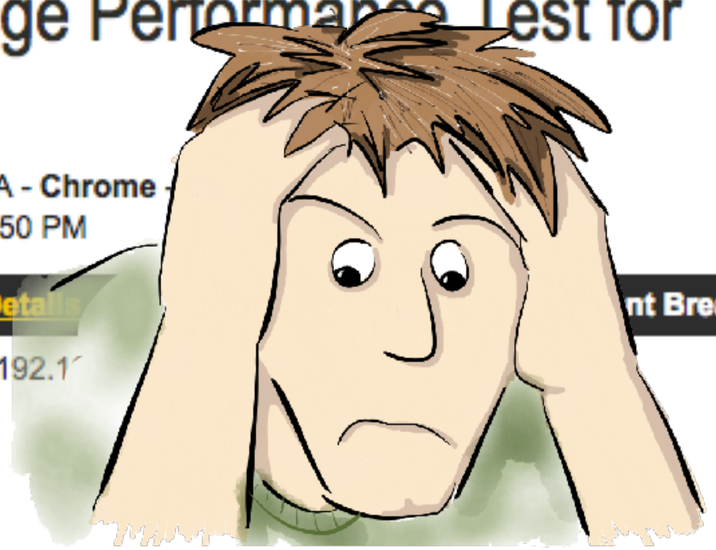
WEBPAGETEST

$2 millions

HOME | TEST RESULT | TEST HISTORY | FORUMS | DOCUMENTATION | ABOUT

Need help improving?

Web Page Performance Test for



From: Dulles, VA - **Chrome** -
3/20/2017, 1:59:50 PM

A	A	A	A	D	✓
First Byte Time	Keep-alive Enabled	Compress Transfer	Compress Images	Cache static content	Effective use of CDN

Summary | Details | nt Breakdown | Domains | Processing Breakdown | Screen Shot

Tester: VM2-08-192.1
First View only
Test runs: **3**

Export HTTP Archive (.har)

	Load Time	First Byte	Start Re	Visually	Speed	Interactive	Result (code)	Document Complete Time	Document Complete Requests	Document Complete Bytes In	Fully Loaded Time	Fully Loaded Requests	Fully Loaded Bytes In	Fully Loaded Certificates
First View (Ru	8.143s	3s	1	14.200s		> 15.013s	)	8.143s	70	3,786 KB	12.512s	131	4,556 KB	125 KB

Interactive (beta)	RUM First Paint	domInteractive	domContentLoaded	loadEvent
> 15.013s	0.983s	1.305s	1.305s - 1.306s (0.001s)	8.112s - 8.138s (0.026s)

https://goo.gl/cd3QCE

Waterfall View

PERF RMANCE

is not

MATHEMATICS

PERF RMANCE

is

PERCEPTION

PSYCHOLOGICAL PERFORMANCE OPTIMISATION

WEBER-FECHNER LAW

JND

(just noticeable difference)

20% RULE

EVENT	20%

NOTICEABLE

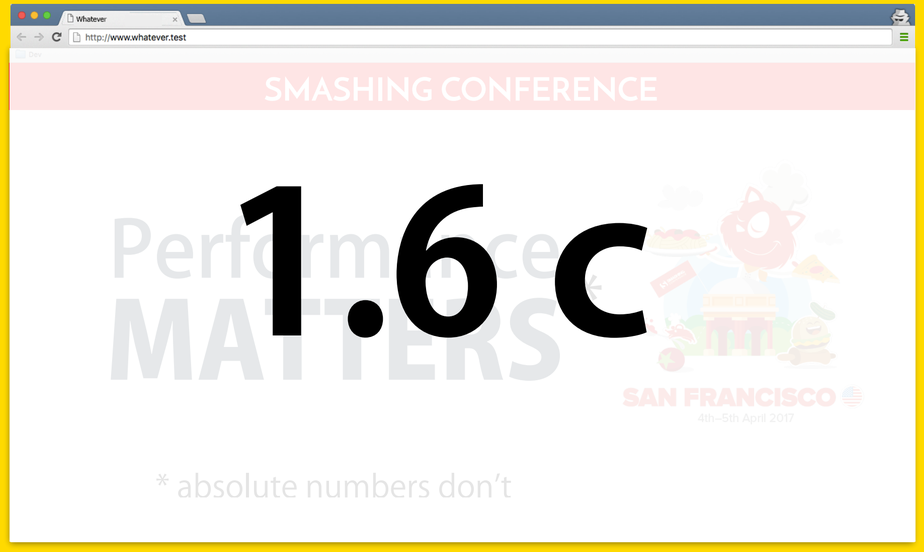
MEANINGFUL

OPTION 1

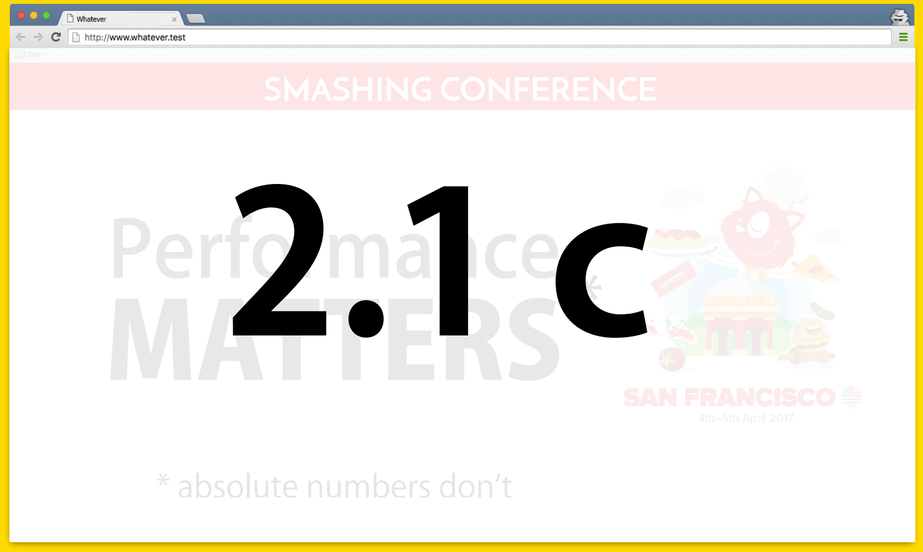
OPTION 2

OPTION 3

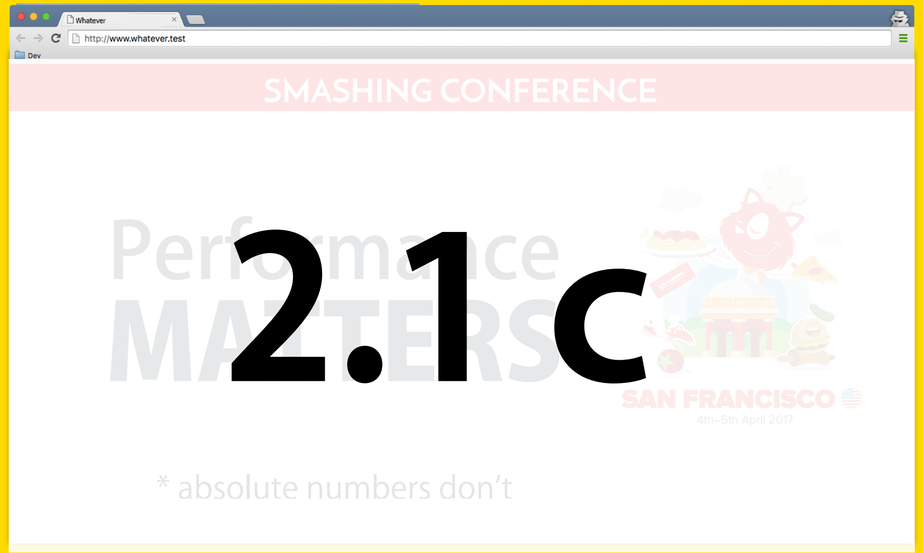
OPTION 1



OPTION 2



OPTION 3



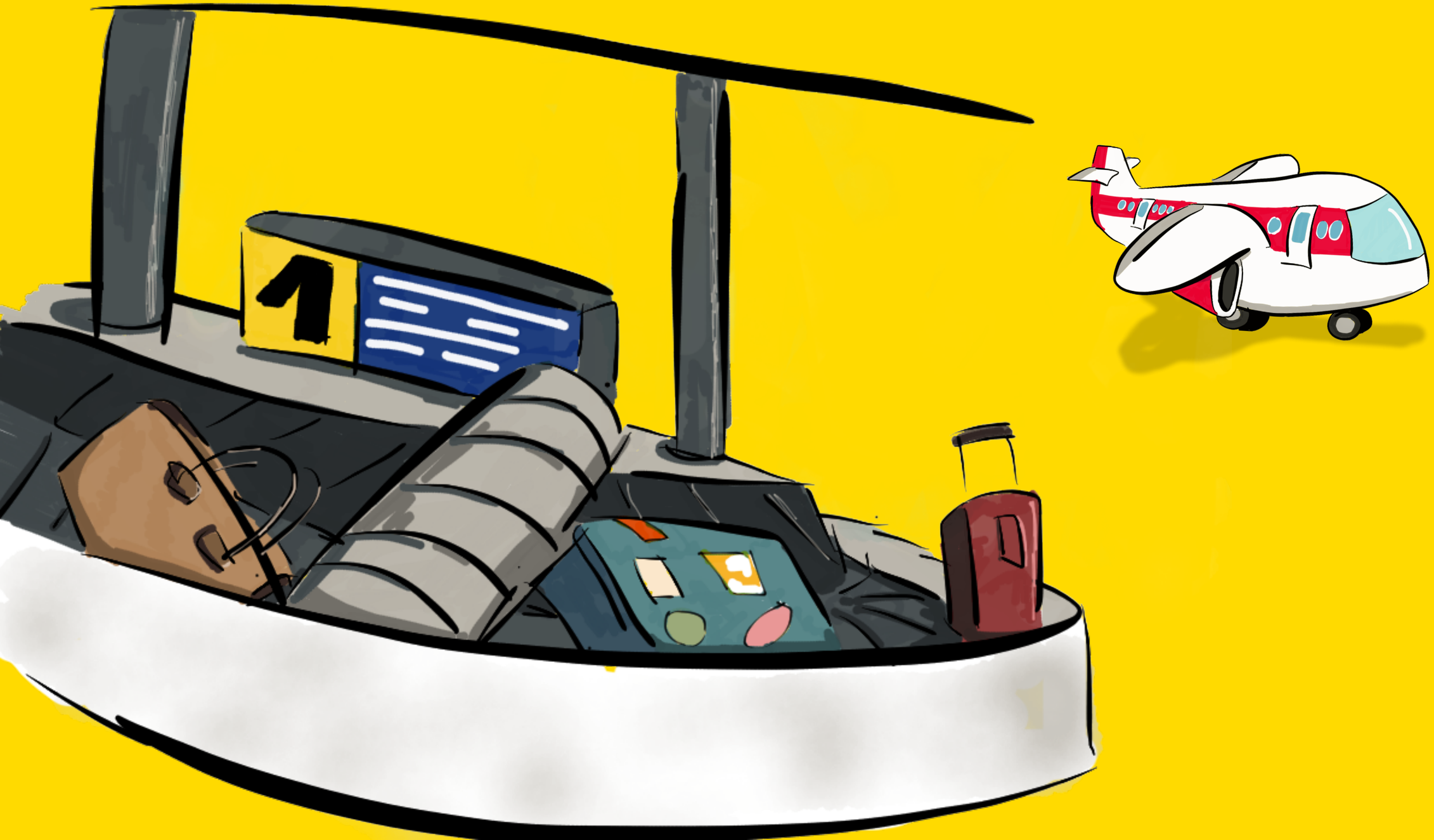
20% RULE

20% RULE

REGRESSION ALLOWANCE

EVENT	+20%

1


1

“

TIME persists merely as a consequence of the **EVENTS** taking place in [space].

”

Martin Heidegger

ACTIVE

PASSIVE

ACTIVE

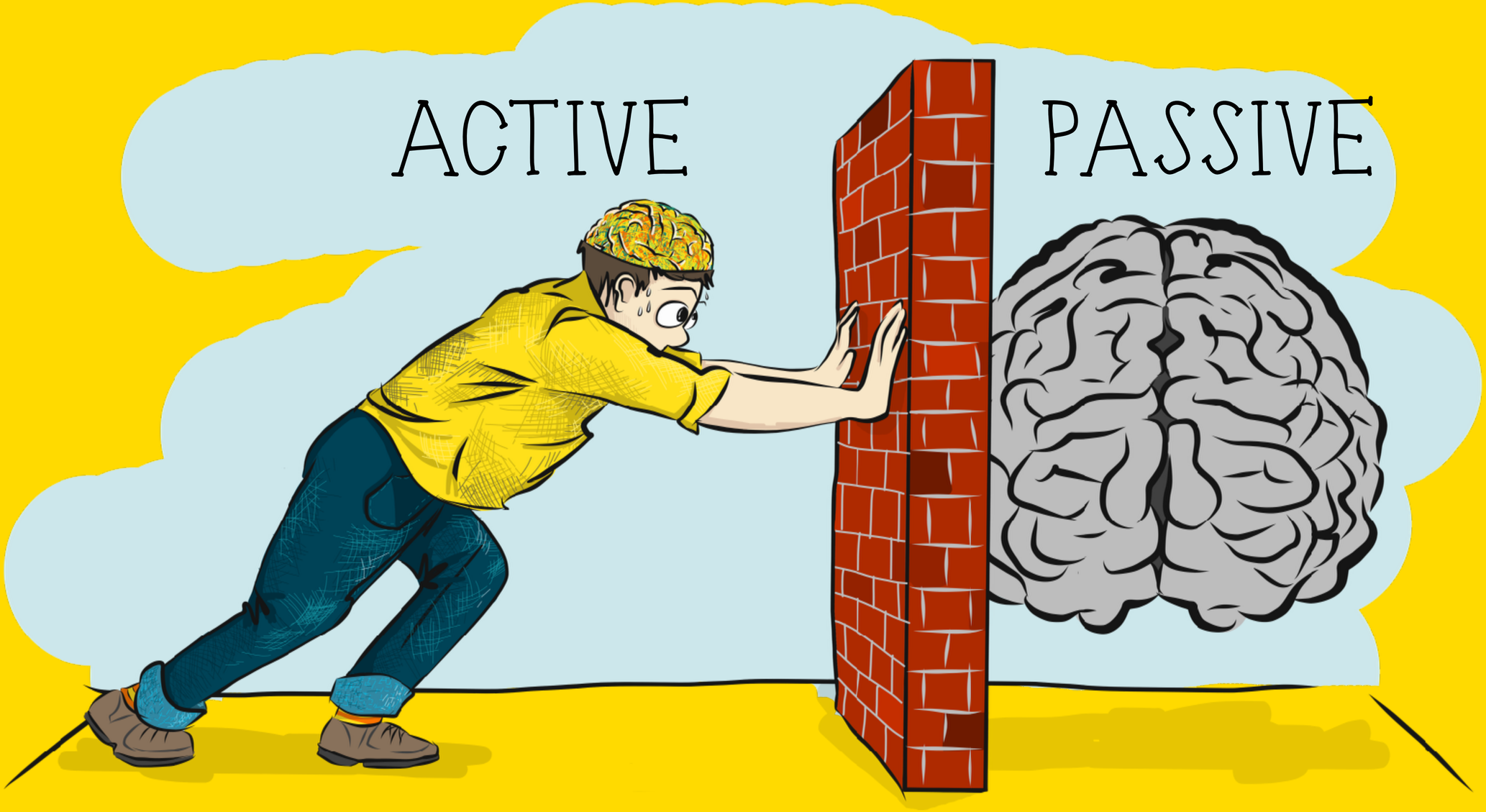
PASSIVE

ACTIVE

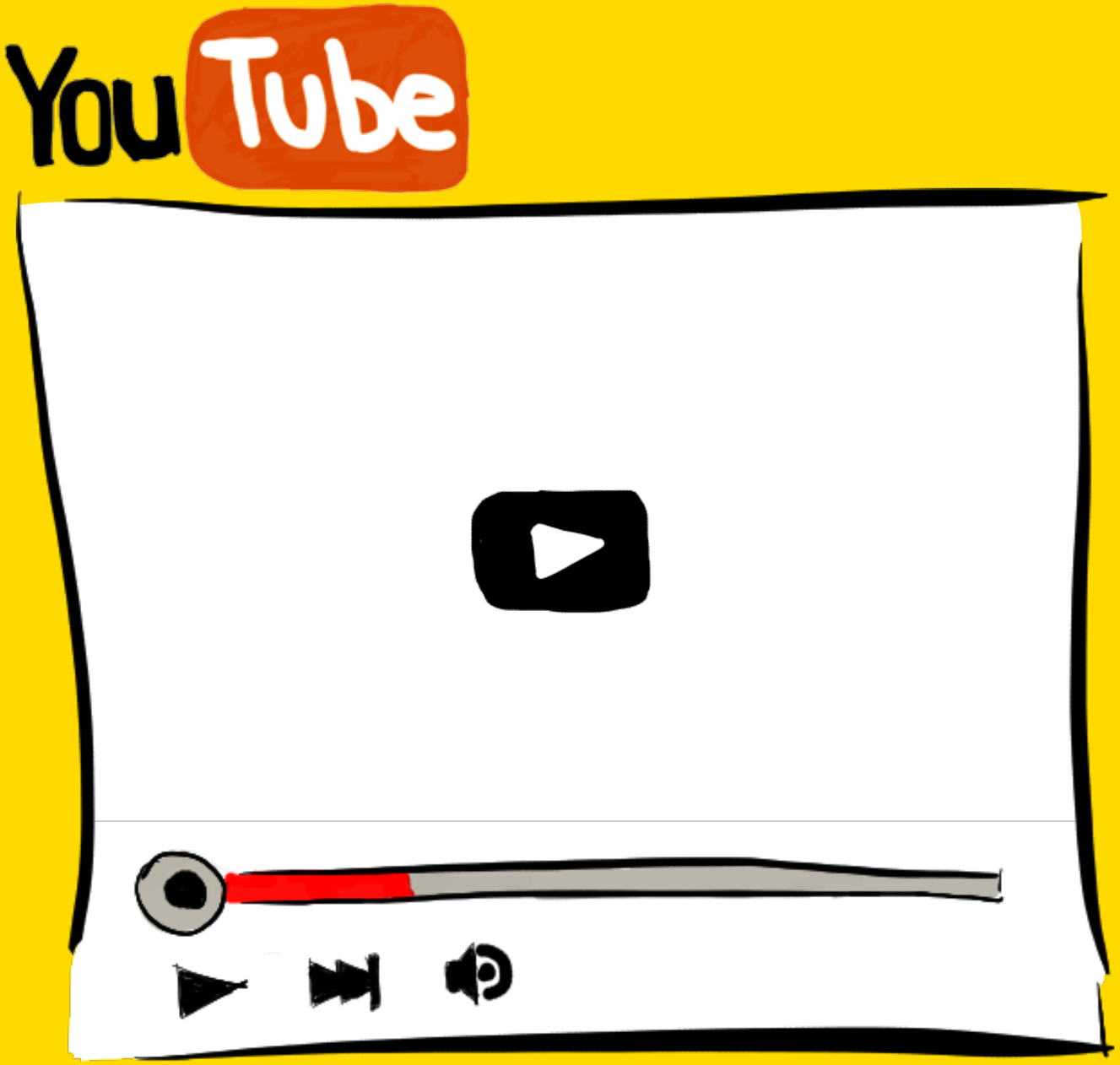
PASSIVE

36%

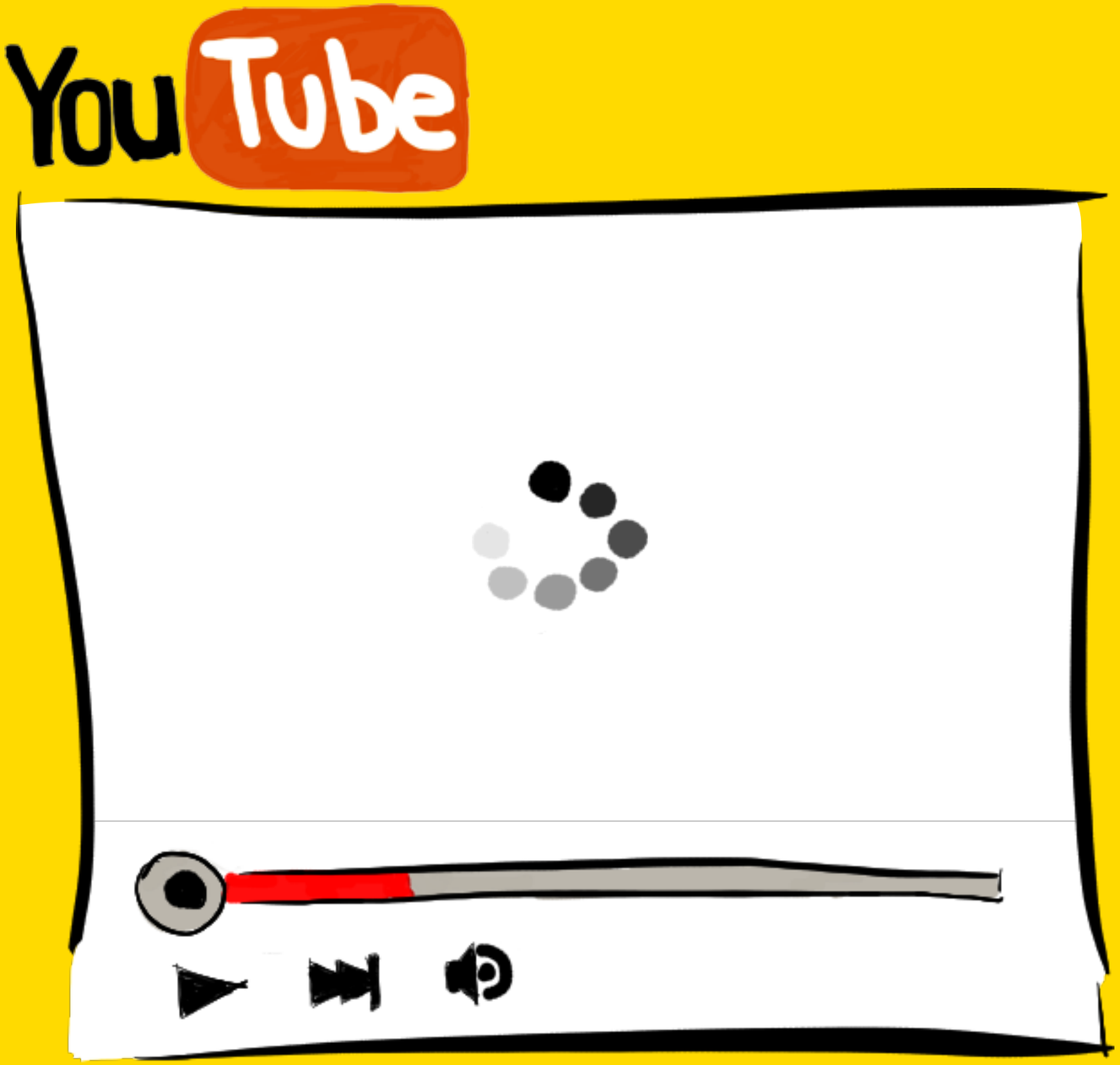
PSYCHOLOGICAL PERFORMANCE OPTIMISATION



PASSIVE
PHASE



PASSIVE
PHASE

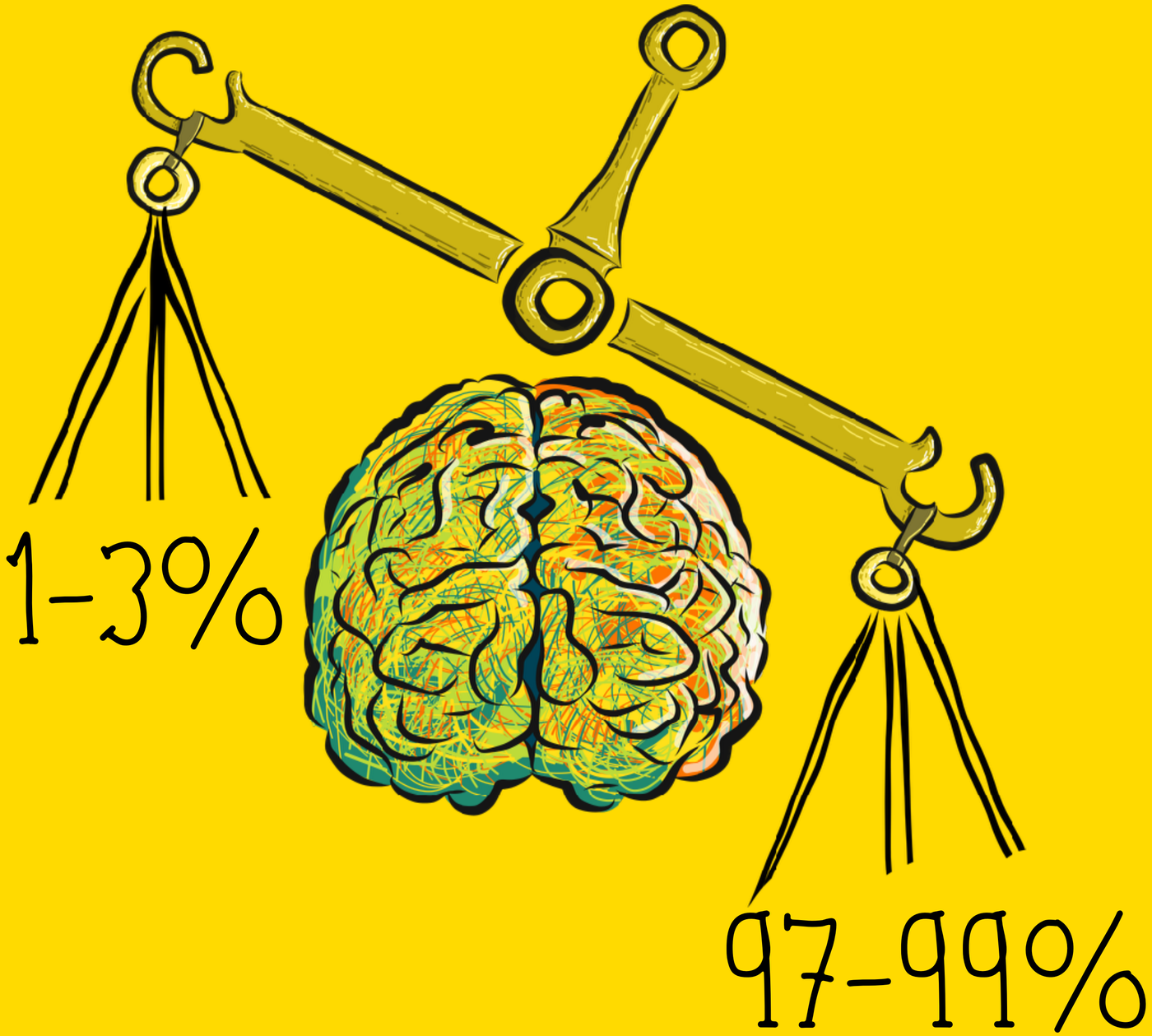


ACTIVE
PHASE

Video source: http://reykjaviksightseeing.is/

OPTIMISTIC UI

FAILURE



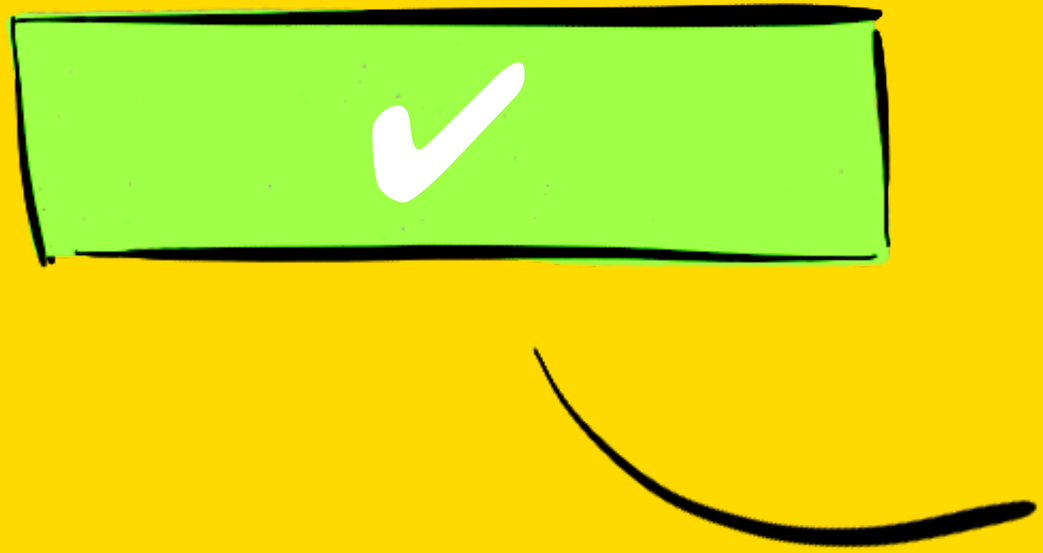
SUCCESS

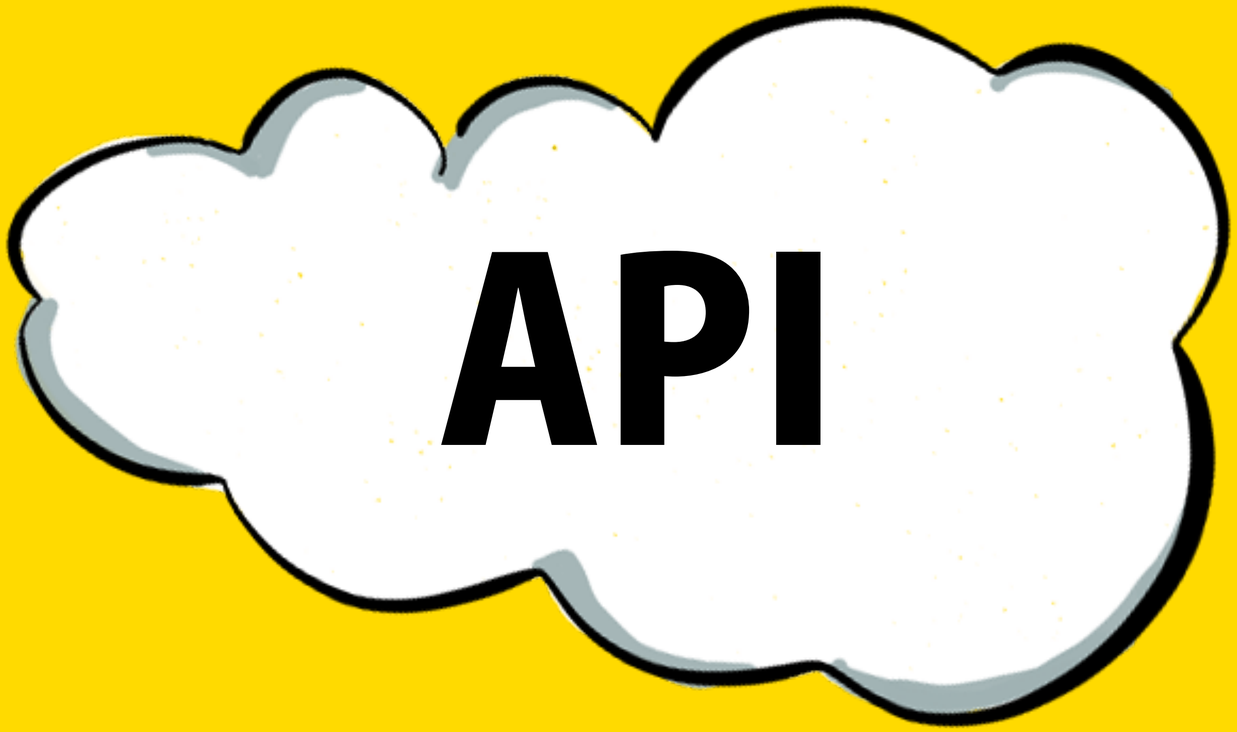
OPTIMISTIC UI

CLICK ME

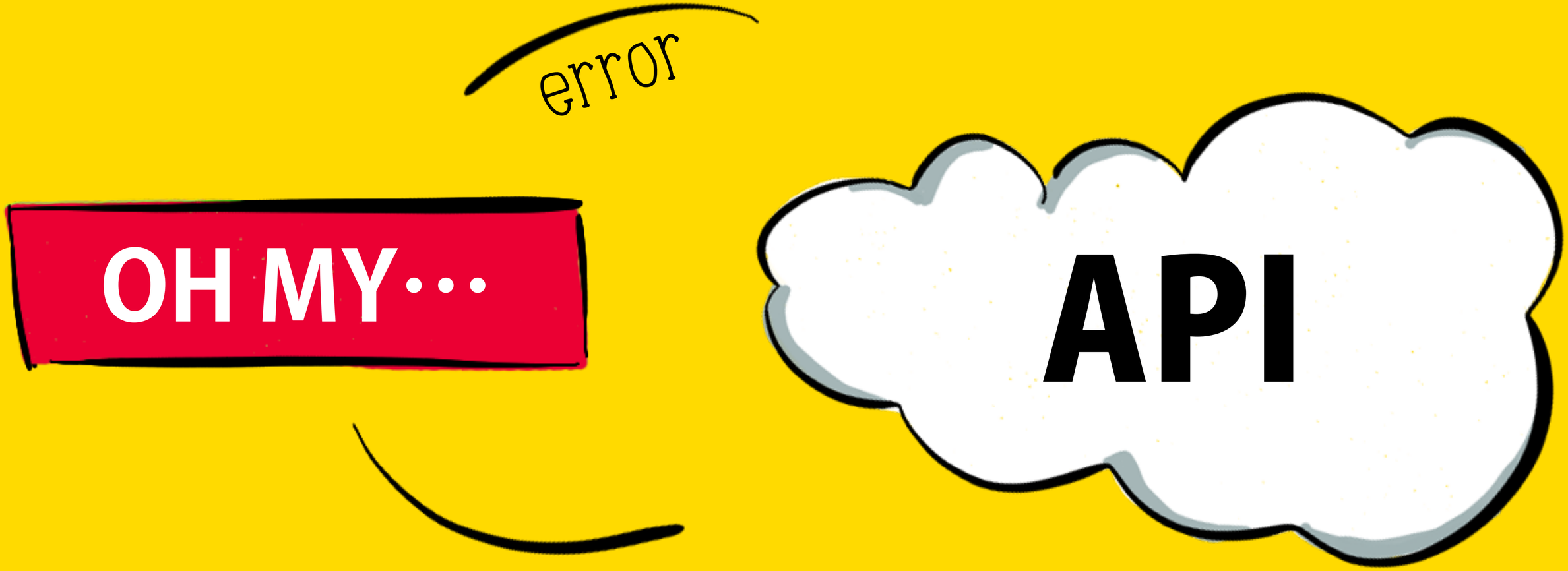
OPTIMISTIC UI

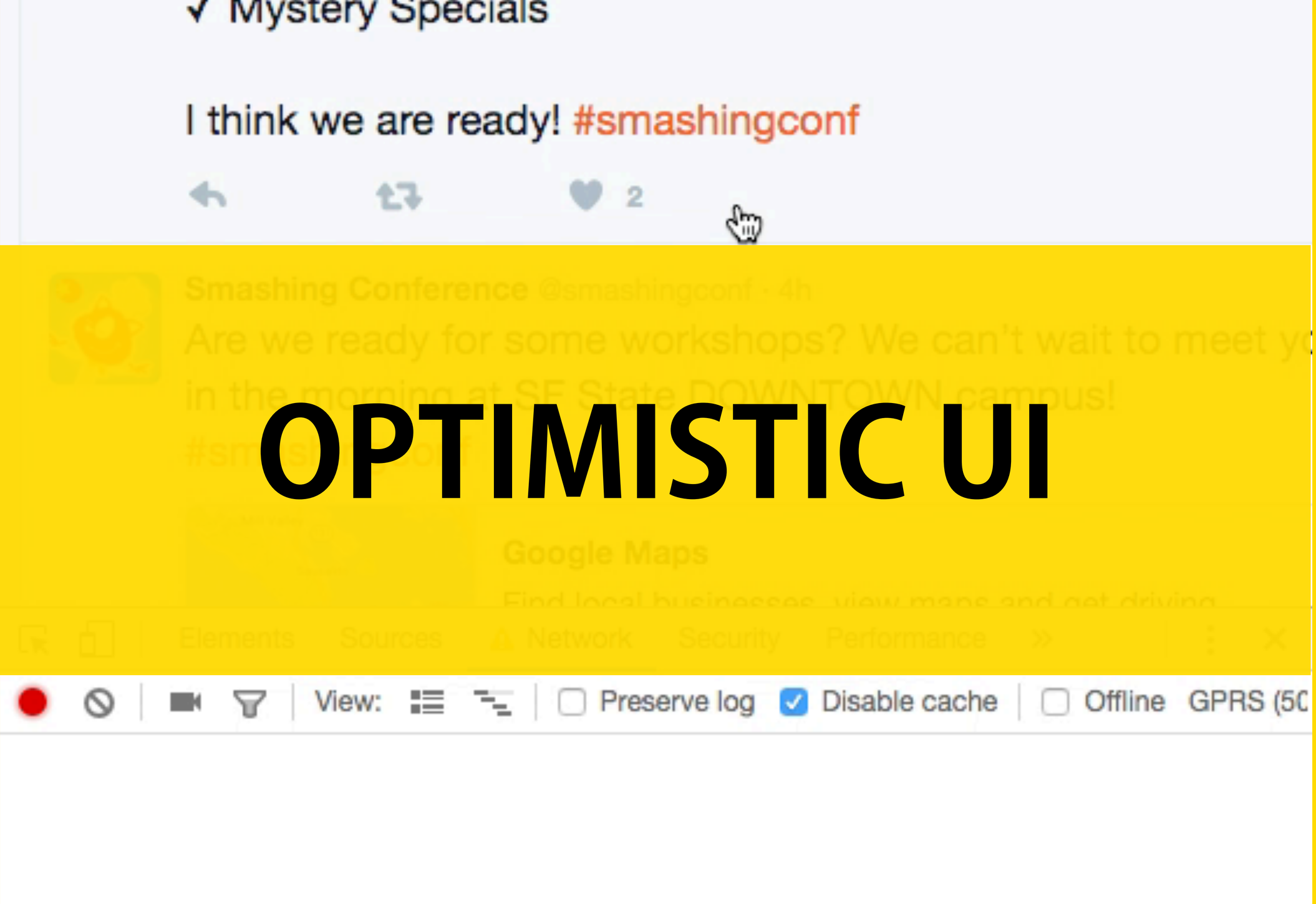
OPTIMISTIC UI





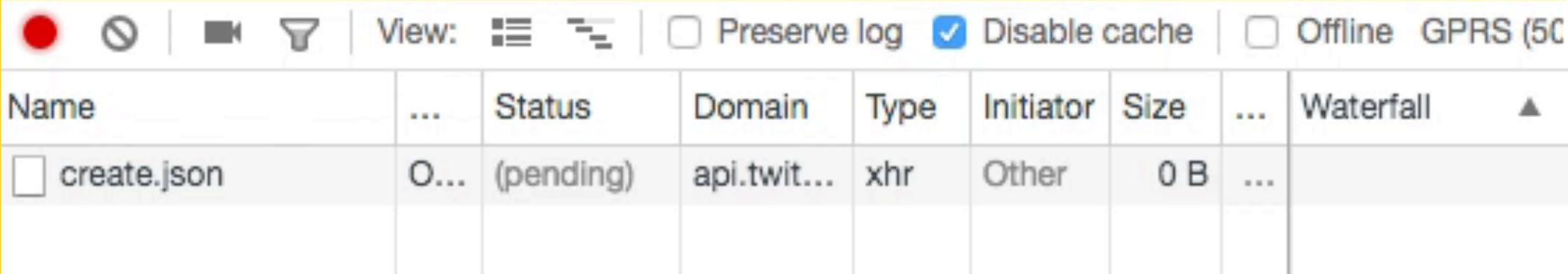
OPTIMISTIC UI





OPTIMISTIC UI

OPTIMISTIC UI



✓ Mystery Specials

I think we are ready! #smashingconf

2

OPTIMISTIC UI

View: Preserve log Disable cache Offline GPRS (50

Name	...	Status	Domain	Type	Initiator	Size	...	Waterfall
create.json	O...	200	api.twit...	xhr	Other	46...	...	
create.json	P...	200	api.twit...	xhr	Other	1.7...	...	

RESOURCE HINTS

<link rel="…" href="…">

https://www.w3.org/TR/2016/WD-resource-hints-20160225/

rel="**dns-prefetch**"

rel="**preconnect**"

rel="**prefetch**"

rel="**prerender**"

rel="**preload**" as="**type**"

http://goo.gl/Kk3qJD

rel="**dns-prefetch**"

rel="**preconnect**"

rel="**prefetch**"

rel="**prerender**"

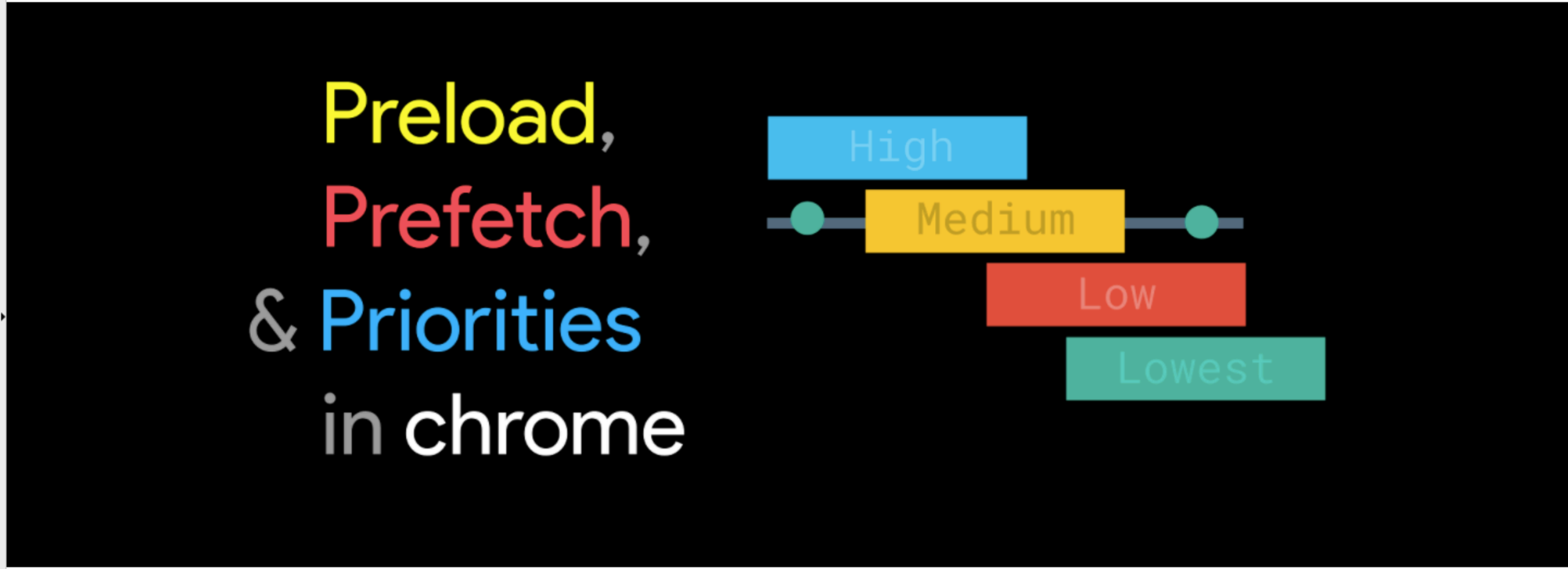
rel="**preload**" as="**type**"

http://goo.gl/Kk3qJD

Preload, Prefetch And Priorit

A Medium Corporation [US] medium.com/reloading/preload-prefetch-and-priorities-in-chrome-776165961bbf

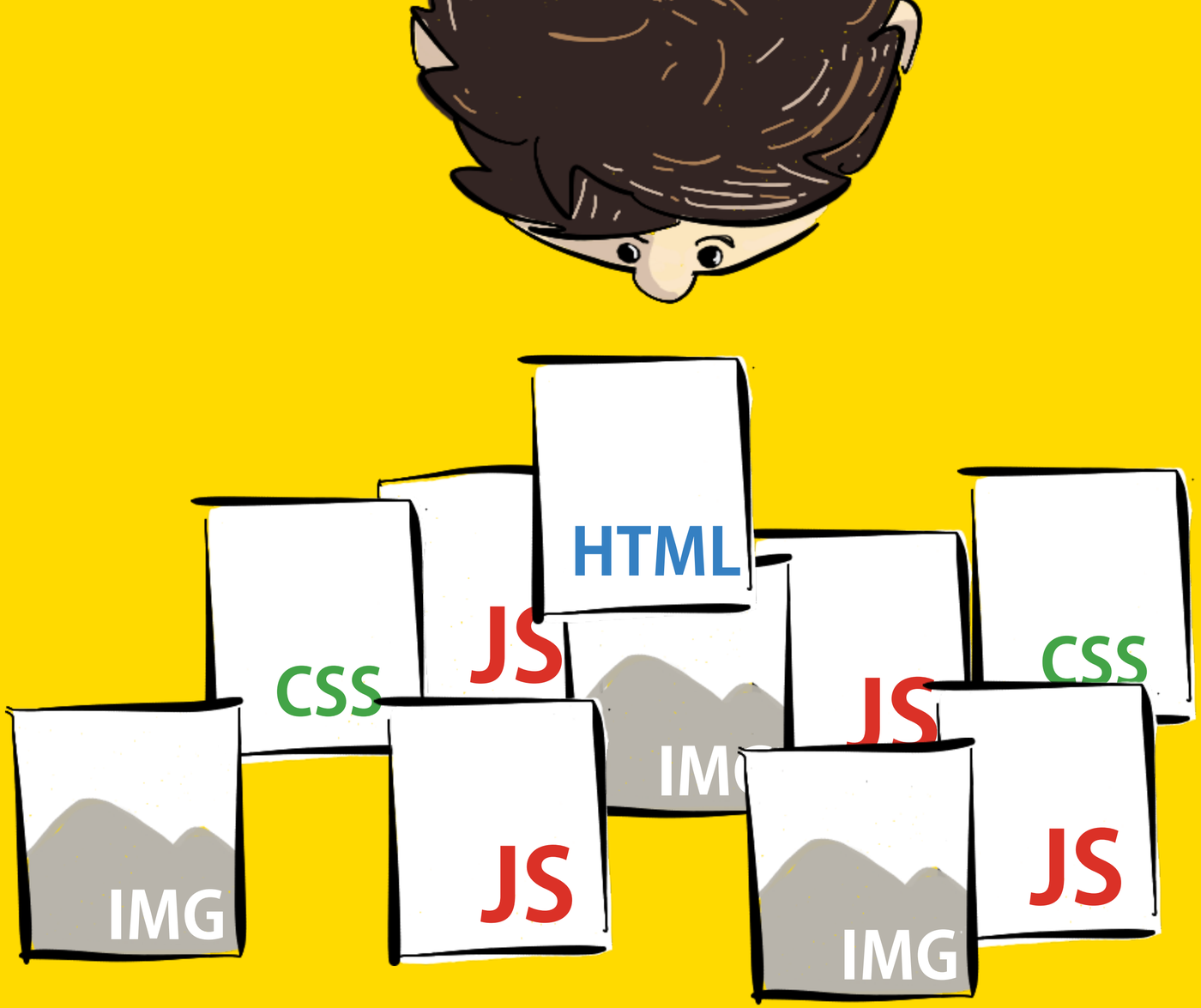
Addy Osmani Follow
Staff Engineer at Google working with the Chrome team • Creator of TodoMVC, Yeoman, Material De...
4 days ago · 12 min read



goo.gl/qjmum

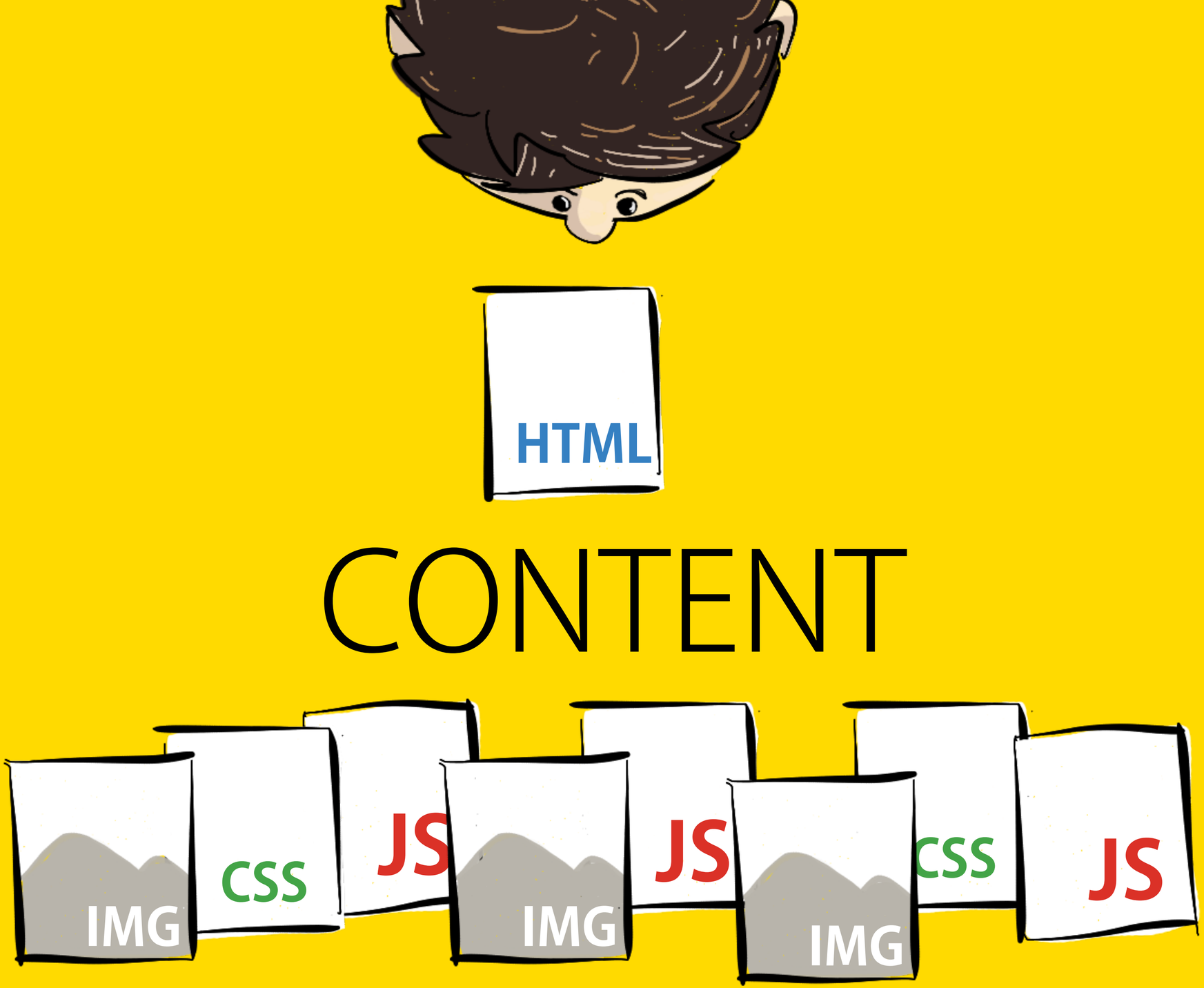
Preload, Prefetch And Priorities

CRITICAL PATH

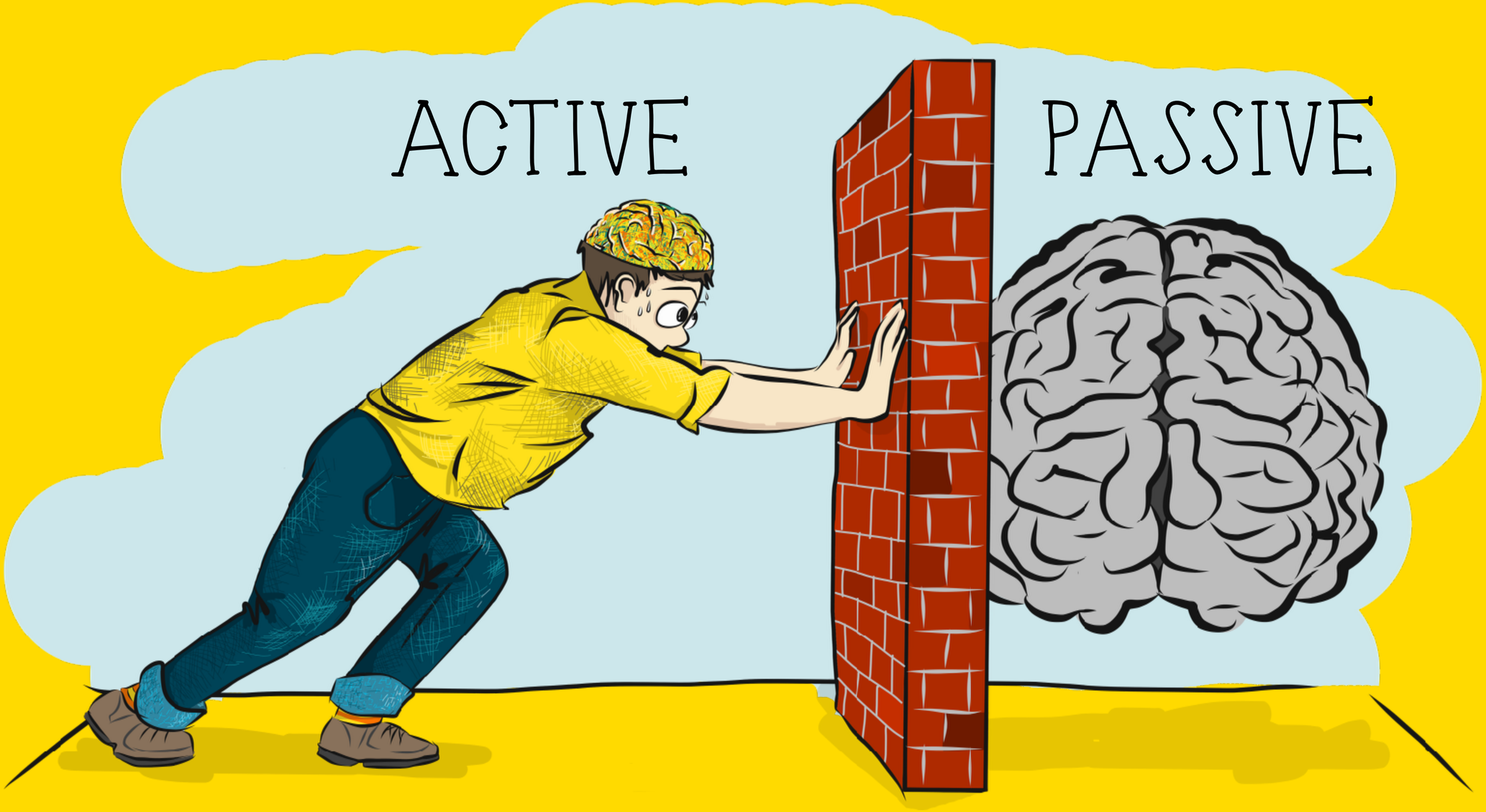


CRITICAL PATH

CONTENT


CRITICAL PATH
HTML
CONTENT
IMG
CSS
JS
IMG
JS
IMG
CSS
JS

PSYCHOLOGICAL PERFORMANCE OPTIMISATION



goo.gl/zfCLhs

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Google Analytics
ScoreCard Research Beacon

Upload 1 of 1

Uploading - 86%

Title*
Slides

Description*

Category*
Choose category

Privacy
Public

Tags
Add tags to make your content more discoverable

Discoverability Score

Add a lead form
Convert my captive SlideShare audience into business leads.

Publish

Facebook Connect
Google Analytics
ScoreCard Research Beacon

SlideShare | Search | Upload

Home | Technology | Education | More Topics | My Clipboards | For Uploaders | Collect Leads

Upload 1 of 1

Title*

Illusion of Time [JSConfEU 2015 edition]

Description*

What is common for Walt Disney World, airports and magicians? All of these are distorting user's perception to build illusions that make us feel good even though we don't notice them so easily.

Category*

Choose category

Privacy

Public

Tags

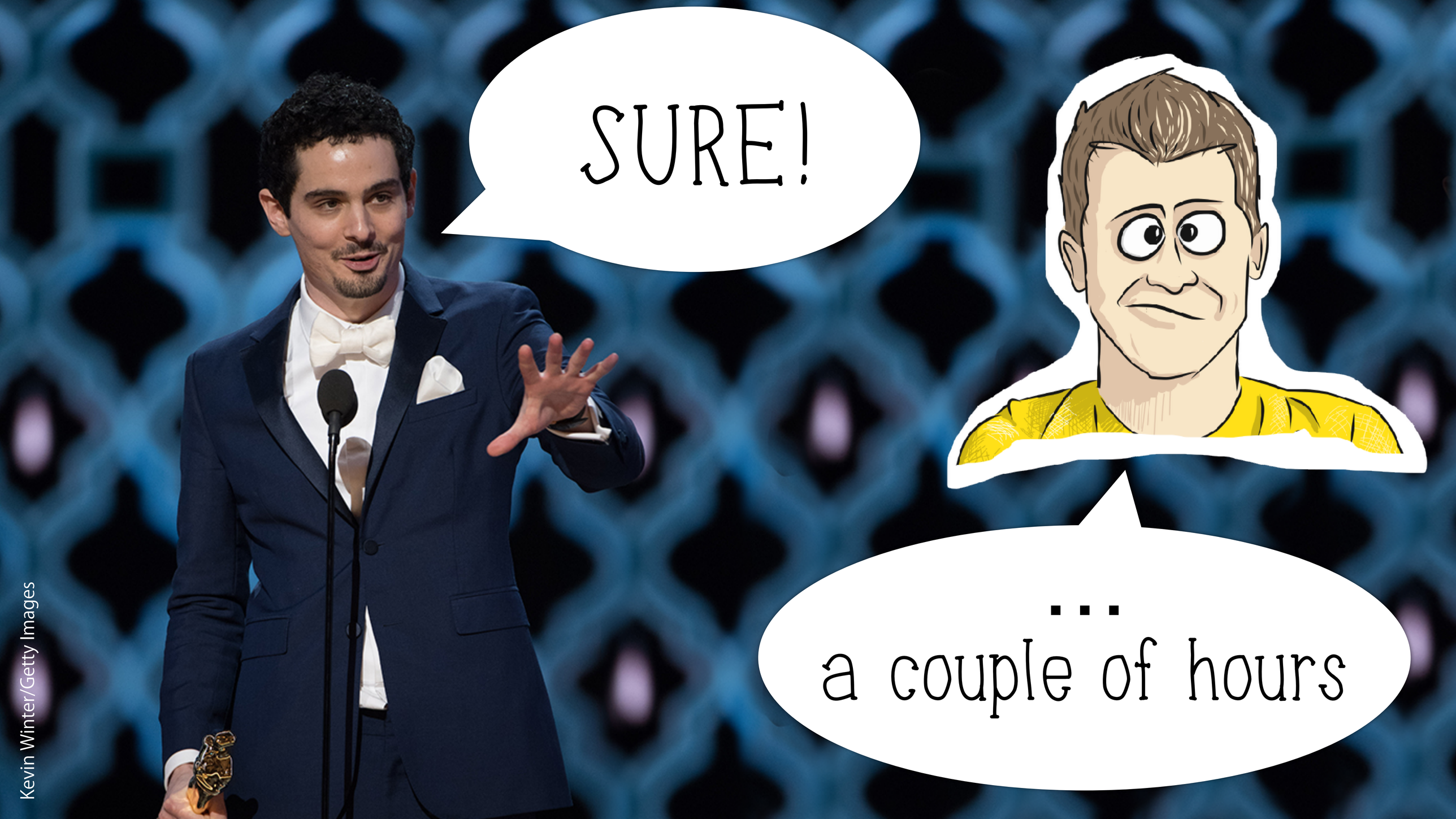
Add tags to make your content more discoverable

Discoverability Score

Add a lead form

☐ Convert my captive SlideShare audience into business leads.

Publish



Kevin Winter/Getty Images

The Performance Experiment

LA LA WEB

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The Performance Experiment
LALAWEB

La La Land - Official Movie S

www.lalaland.movie

RYAN GOSLING EMMA STONE

LA LA LAND

NOW PLAYING EVERYWHERE

WINNER
6 ACADEMY AWARDS

BEST ACTRESS
EMMA STONE

BEST DIRECTOR
DAMIEN CHAZELLE

BEST ORIGINAL SCORE
JUSTIN HURWITZ

BEST ORIGINAL SONG
"CITY OF STARS"

BEST CINEMATOGRAPHY

BEST PRODUCTION DESIGN

WINNER
7 GOLDEN GLOBE® AWARDS
BEST PICTURE
MUSICAL OR COMEDY

BEST ACTRESS MUSICAL OR COMEDY EMMA STONE
BEST ACTOR MUSICAL OR COMEDY RYAN GOSLING
BEST DIRECTOR DAMIEN CHAZELLE

BEST SCREENPLAY DAMIEN CHAZELLE
BEST ORIGINAL SCORE JUSTIN HURWITZ

BEST ORIGINAL SONG "CITY OF STARS"

WINNER
NATIONAL BOARD OF REVIEW
TOP 10 FILMS OF THE YEAR

WINNER
8 CRITICS' CHOICE AWARDS
INCLUDING
BEST PICTURE

BEST DIRECTOR – DAMIEN CHAZELLE
BEST SCORE – JUSTIN HURWITZ
BEST SONG – "CITY OF STARS"

BUY MUSIC | GET TICKETS | ENTER SITE

Reset 100 %

CONSTRAINTS

A COUPLE OF HOURS (REALLY)

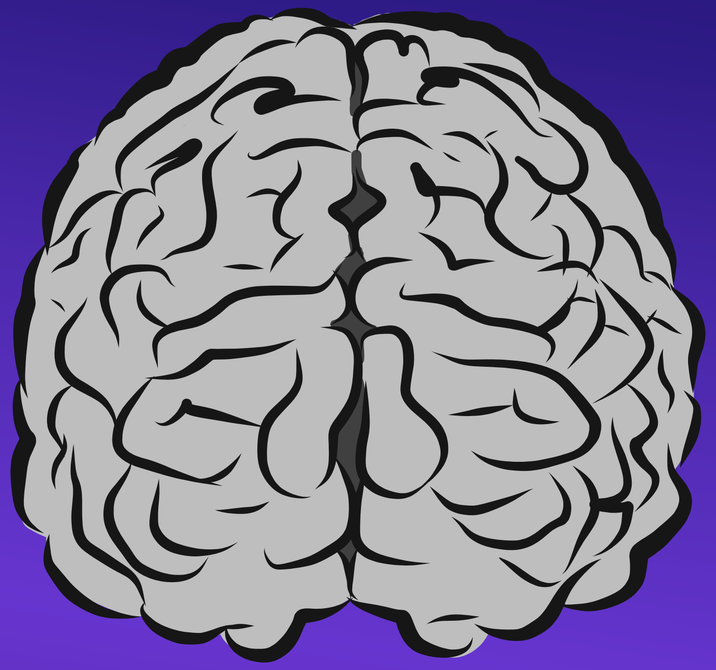
NO CHANGES TO FUNCTIONALITY

PRIORITISE PERCEPTION

PASSIVE

0.0s

lalaland.movie



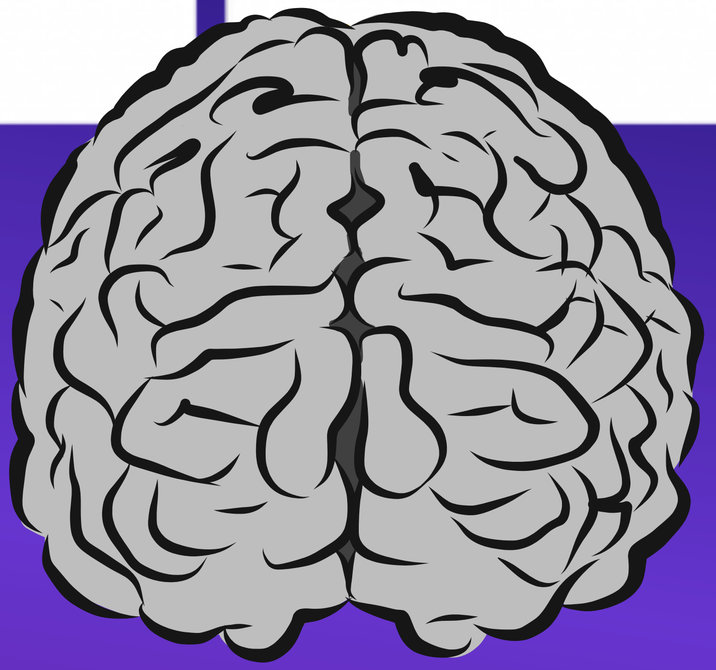
PASSIVE

13.0s

13.5s

14.0s

14.5s



PASSIVE

14.5s

15.0s

ACTIVE

15.5s

16.0s

REASONS

WAITS FOR
ALL
ASSETS/SECTIONS

WAITS FOR **ALL** ASSETS/SECTIONS

La La Land - Official Movie S

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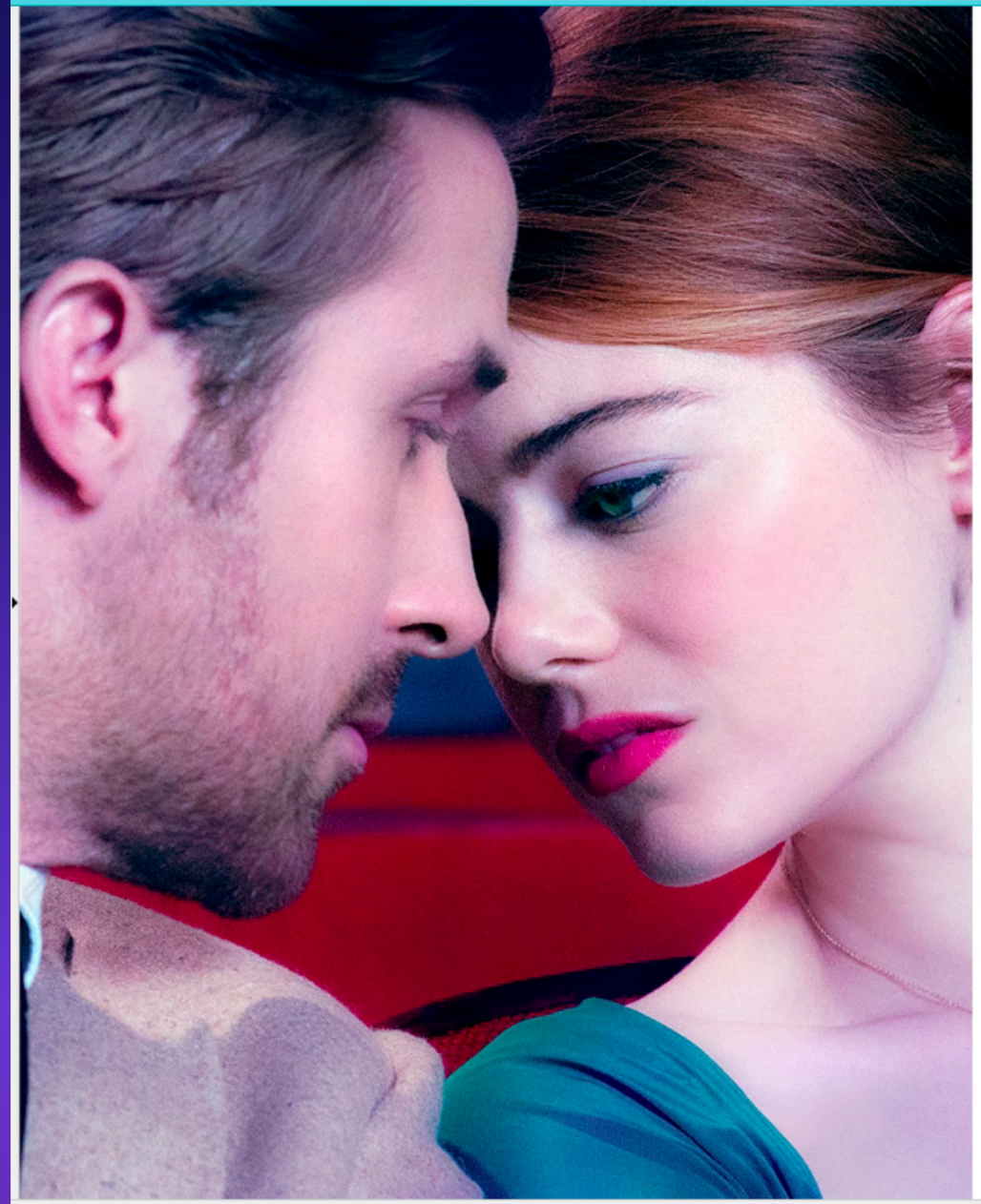

RYAN GOSLING EMMA STONE

LA LA LAND

NOW PLAYING EVERYWHERE

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6 ACADEMY AWARDS

BEST ACTRESS
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DAMIEN CHAZELLE

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WINNER
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8 CRITICS' CHOICE AWARDS
INCLUDING
BEST PICTURE
BEST DIRECTOR – DAMIEN CHAZELLE
BEST SCORE – JUSTIN HURWITZ
BEST SONG – "CITY OF STARS"

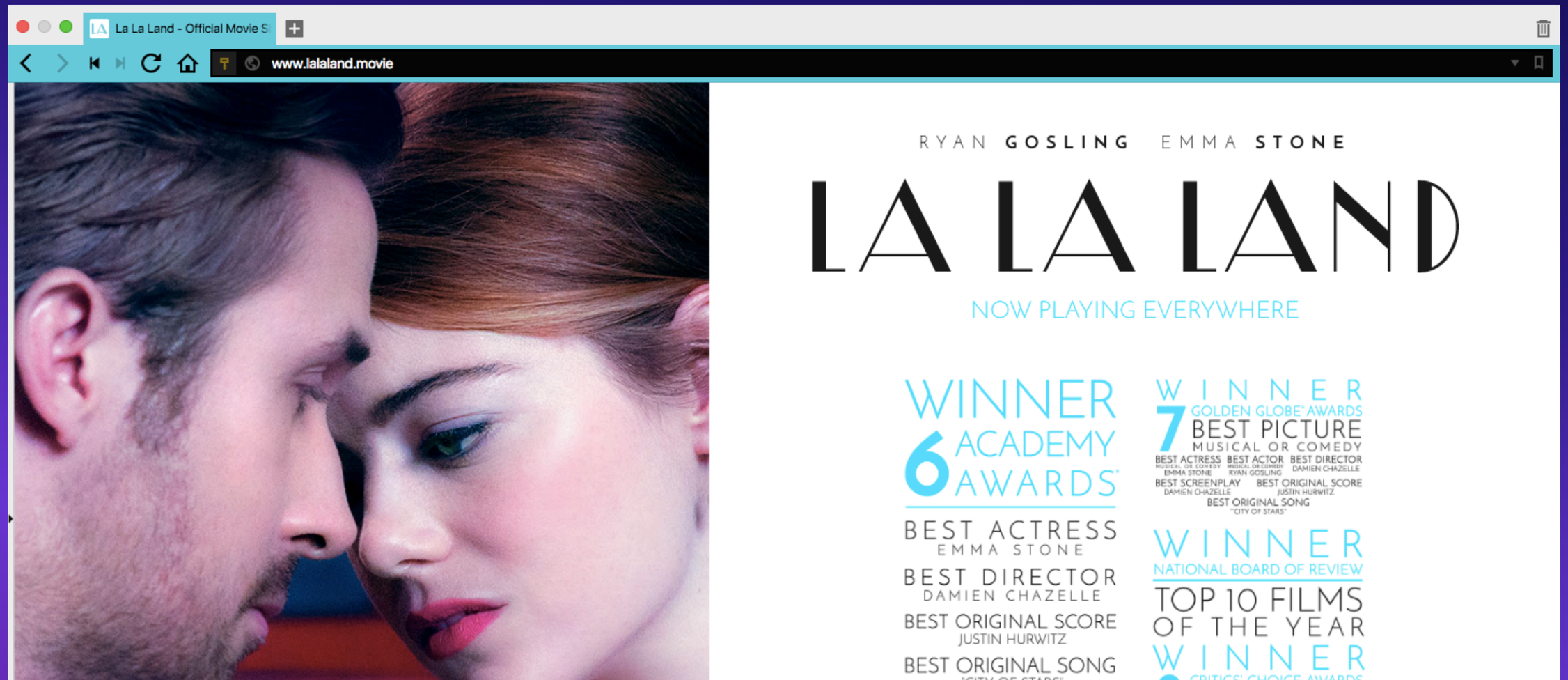
BUY MUSIC | GET TICKETS | ENTER SITE

Reset 100 %

SOLUTION

CRITICAL RENDERING PATH OPTIMISATION

CRITICAL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RYAN GOSLING EMMA STONE
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BEST DIRECTOR
DAMIEN CHAZELLE
BEST SCREENPLAY
DAMIEN CHAZELLE
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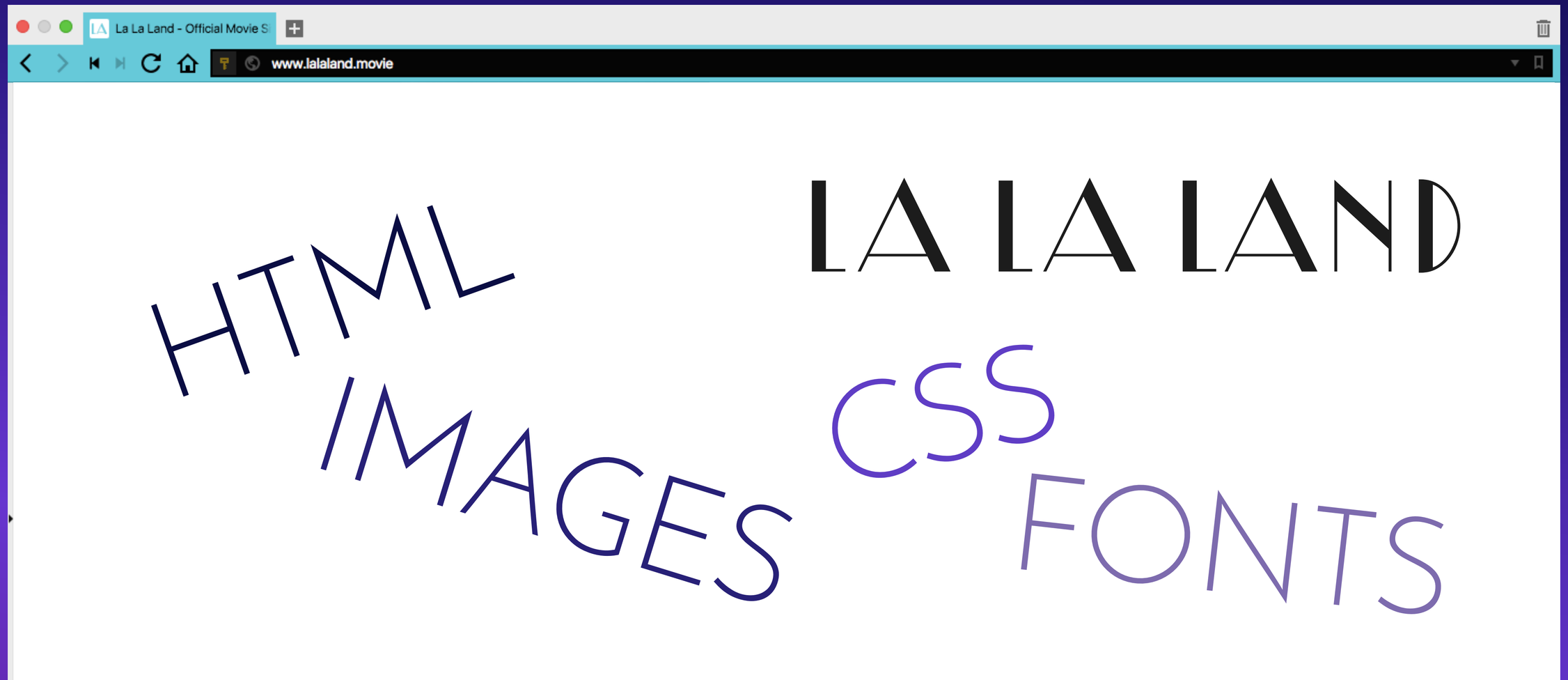
TOP 10 FILMS
OF THE YEAR
WINNER


La La Land - Official Movie S
www.lalaland.movie
LA LA LAND
HTML
IMAGES
CSS
FONTS

HTML

LA LA LAND

HTML.....MINIFIED

Reset 100 %

LA LA LAND

HTML.....MINIFIED

Reset 100 %

CSS

LA LA LAND

HTML.....MINIFIED
CSS.....INLINE CRITICAL

Reset 100 %

MAIN CSS

LA LA LAND

HTML.....MINIFIED
CSS.....INLINE CRITICAL

Reset 100 %

MAIN CSS

FONTS

LA LA LAND

HTML.....MINIFIED
CSS.....INLINE **CRITICAL**
FONTS.....3 (PRELOAD)

Reset 100 %

MAIN CSS
6 FONTS

LA LA LAND

HTML.....MINIFIED
CSS.....INLINE **CRITICAL**
FONTS.....3 (PRELOAD)

Reset 100 %

MAIN CSS
6 FONTS
IMAGES

LA LA LAND

HTML.....MINIFIED
CSS.....INLINE **CRITICAL**
FONTS.....3 (PRELOAD)
IMAGES.....OPTIMISED

Reset 100 %

MAIN CSS
6 FONTS

LA LA LAND

HTML.....MINIFIED
CSS.....INLINE **CRITICAL**
FONTS.....3 (PRELOAD)
IMAGES.....OPTIMISED
+
RESOURCE HINTS

Reset 100 %

MAIN CSS
6 FONTS

LA LA LAND

HTML.....MINIFIED
CSS.....INLINE **CRITICAL**
FONTS.....3 (PRELOAD)
IMAGES.....OPTIMISED
+
RESOURCE HINTS
CACHING

Reset 100 %

MAIN CSS
6 FONTS

LA LA LAND

HTML.....MINIFIED
CSS.....INLINE **CRITICAL**
FONTS.....3 (PRELOAD)
IMAGES.....OPTIMISED
+
RESOURCE HINTS
CACHING

MAIN CSS
6 FONTS
JS

Reset 100 %

LA LA LAND

```
<script
 async
 defer
 src="defered.js">
</script>
```

MAIN CSS

6 FONTS

JS

Reset 100 %

LA LA LAND

```
<script
 async
 defer
 src="defered.js">
</script>
```

MAIN CSS
+ PREFETCH

6 FONTS
+ PREFETCH

JS

Reset 100 %

LA LA LAND

```
<script
 async
 defer
 src="defered.js">
</script>
```

+ PRELOAD

MAIN CSS

+ PREFETCH

6 FONTS

+ PREFETCH

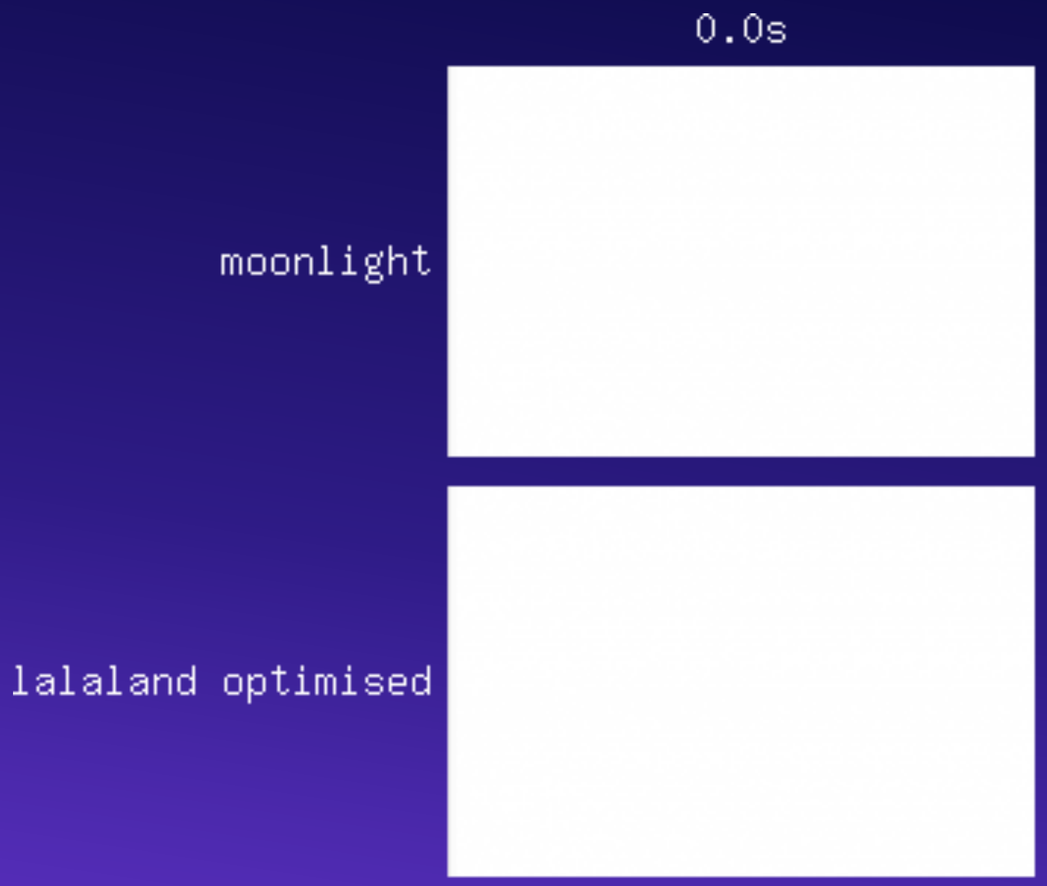
JS

+ PRELOAD

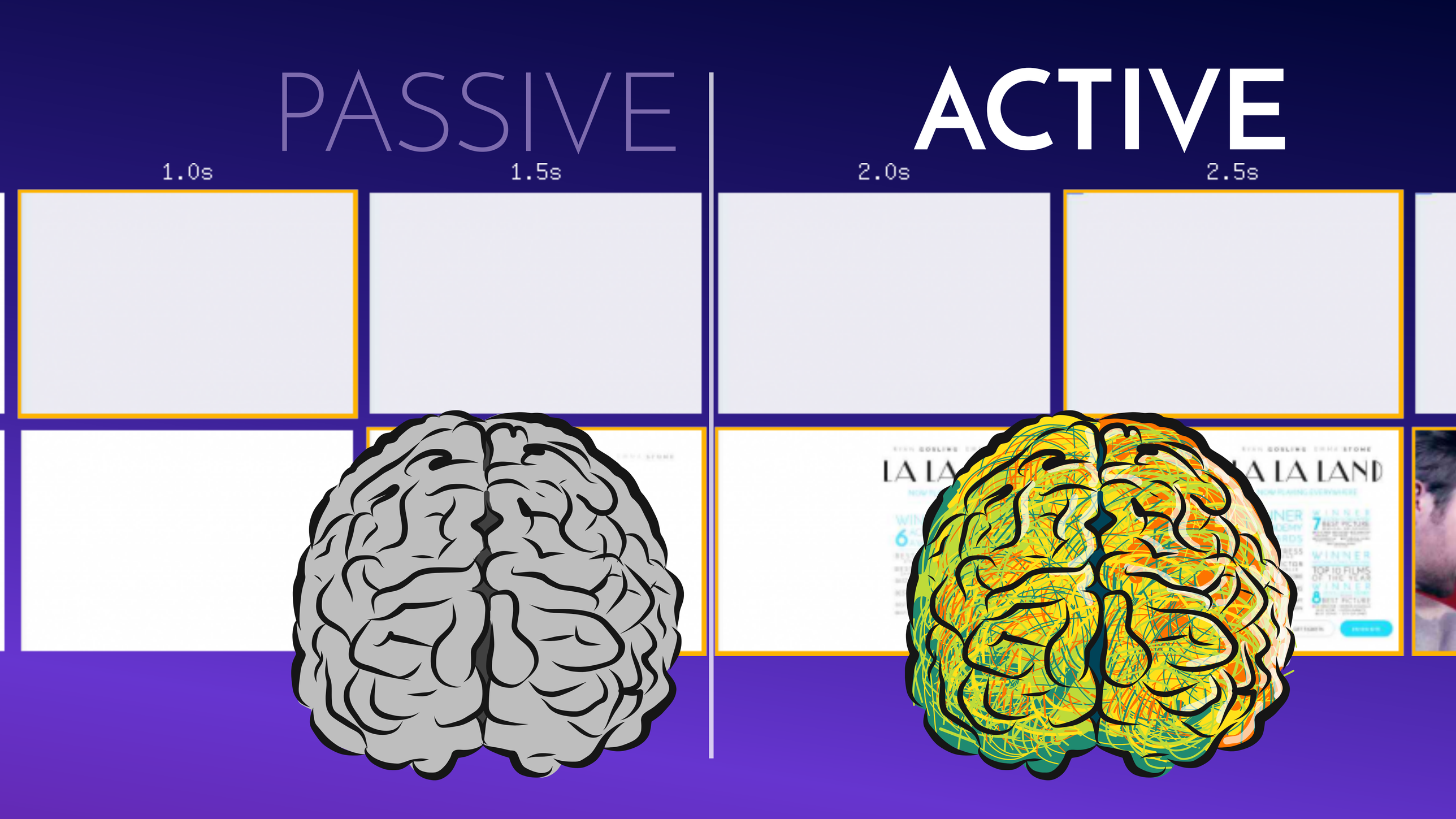
Reset 100 %

LA LA LAND COOKBOOK

HTML.....MINIFIED
CSS.....INLINE **CRITICAL**
FONTS.....3 (PRELOAD)
IMAGES.....OPTIMISED
+
RESOURCE HINTS
CACHING
+
DEFER & DELAY
EVERYTHING ELSE


0.0s
moonlight
lalaland optimised

1.0s
1.5s
2.0s
2.5s
LA LA LAND
NOW PLAYING EVERYWHERE
WINNER
6 ACADEMY AWARDS
7 BEST PICTURE
WINNER
TOP 10 FILMS OF THE YEAR
WINNER
8 BEST PICTURE


PASSIVE
ACTIVE
1.0s
1.5s
2.0s
2.5s
LA LA LAND

goo.gl/kk9ZLu

START RENDER

13.879s

TTI

> 17.516s

SPEED INDEX

14324

goo.gl/emWOfi

START RENDER

13.879s

0.921s

TTI

> 17.516s

> 5.511s

SPEED INDEX

14324

1651

goo.gl/emWOfi

START RENDER

13.879s

0.921s

TTI

> 17.[illegible]s

> 5.511s

SPEED INDEX

14324

1651

88%

FASTER

moonlight

13.2

lalaland optimised

3.1

“The **perception of performance** is just as **effective** as actual performance in many cases”

THANK YOU

YES, THE **ILLUSTRATIONS** ARE MINE:)

DENYS MISHUNOV
DIGITAL GARDEN AS
@mishunov