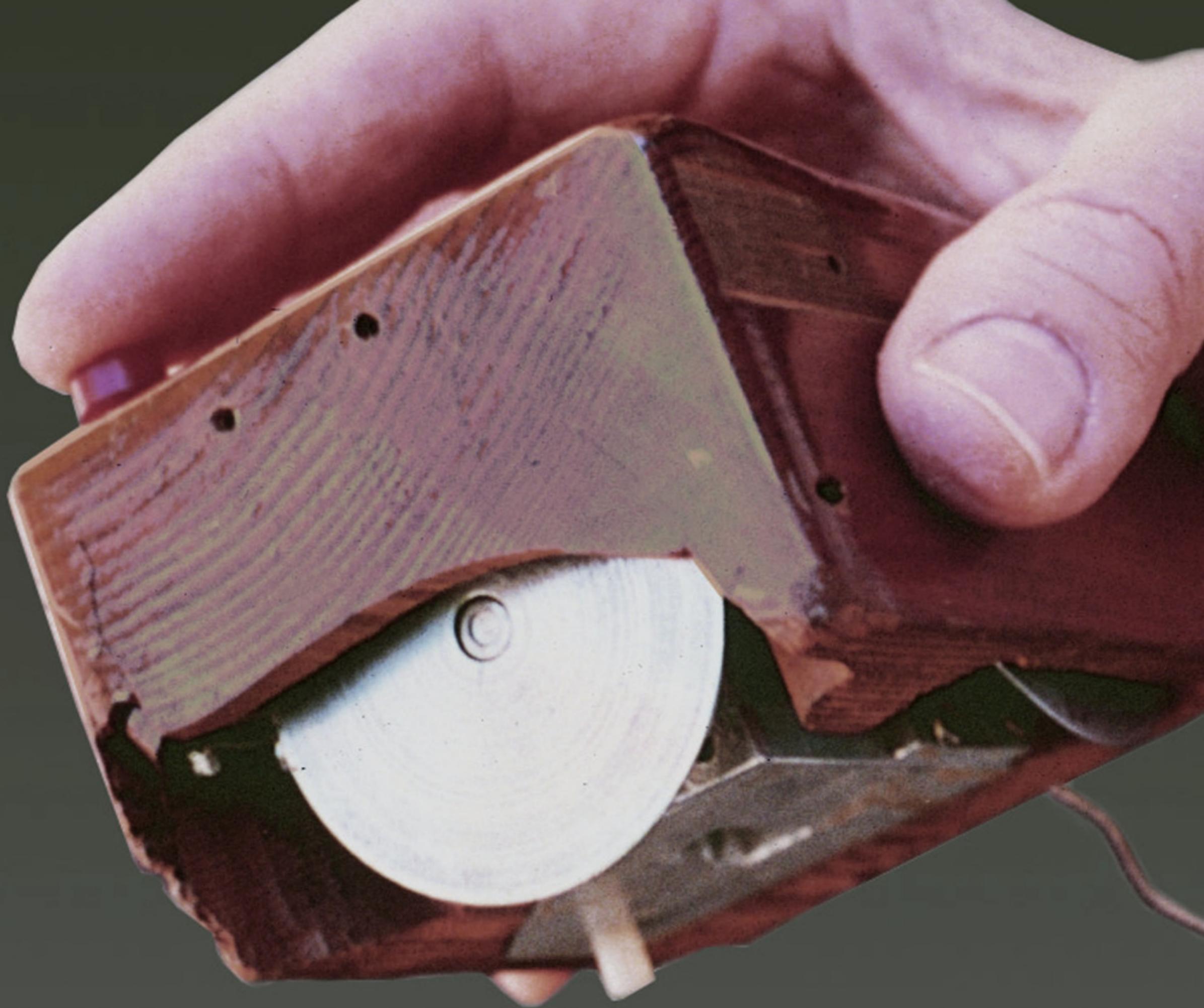


**Все те же 300 мс,**

*или как мелочи могут стать  
большой занозой в браузере*

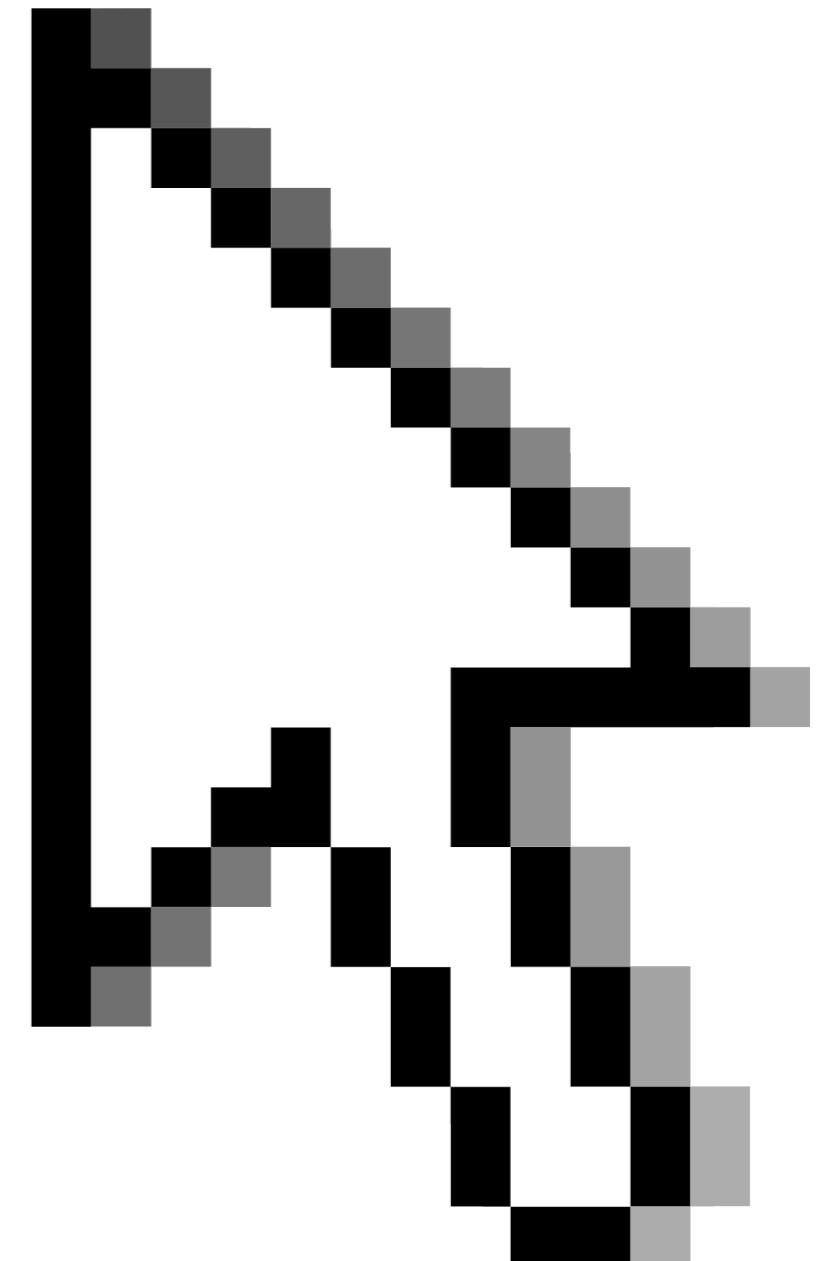
@pukhalski





# Мышь

*mouse events*



mousedown

mouseup

mousemove

mouseover

mouseout

mousedown

mouseup

mousemove

mouseover

mouseout

**click**

mousedown

mouseup

mousemove

mouseover

mouseout

**click**

mouseenter\*

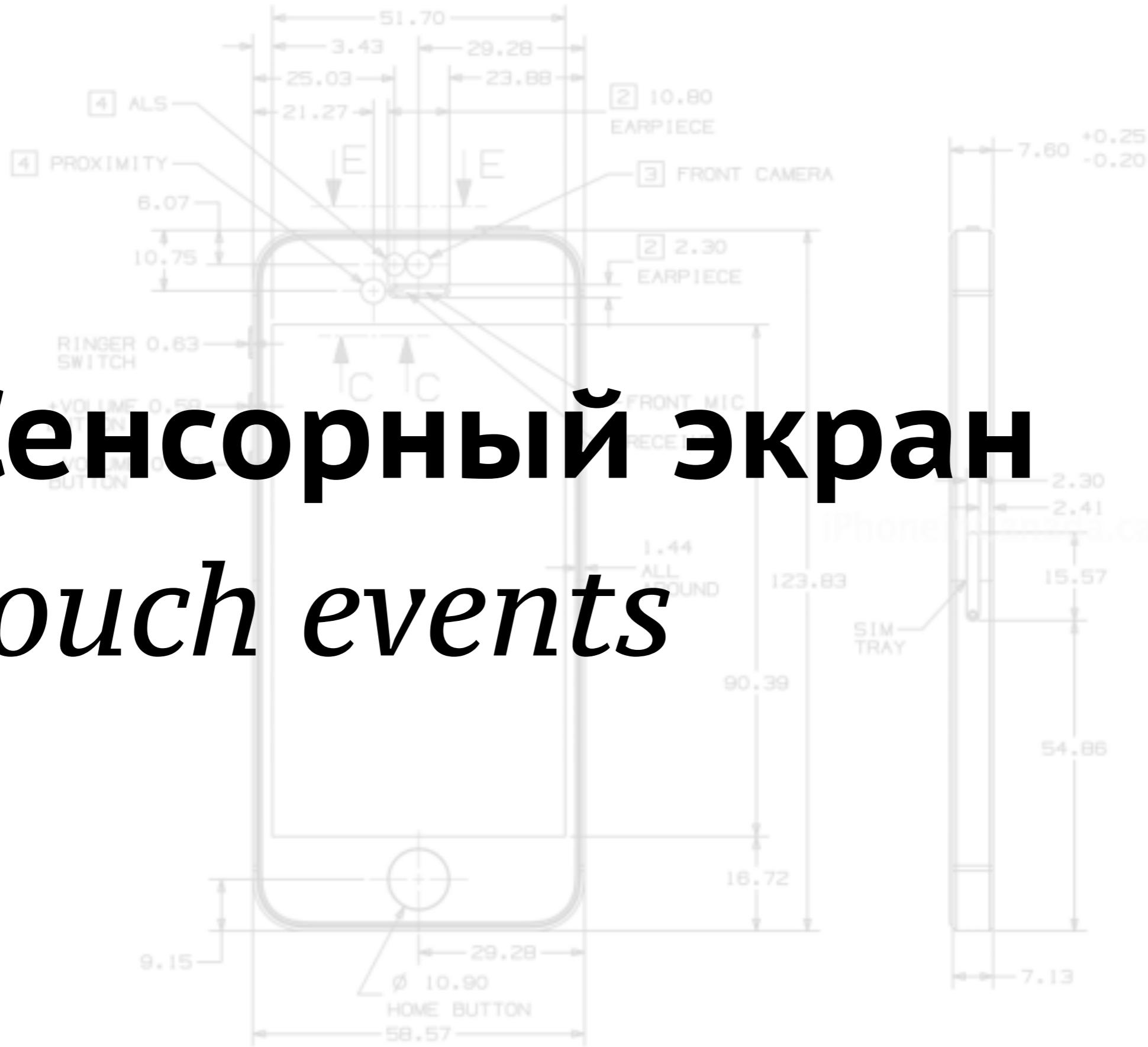
mouseleave\*



**Коснитесь дважды**  
*для увеличения*

# Сенсорный экран

## *touch events*



touchstart

touchmove

touchend

touchcancel

# **Представлены компанией Apple**



# **Представлены компанией Apple**



```
( 'propertyIsEnumerable' in window ||  
'hasOwnProperty' in document )  
&&  
( window.propertyIsEnumerable( 'ontouchstart' )  
|| document.hasOwnProperty( 'ontouchstart' ) )
```

**Любое устройство ввода**  
*pointer events*

pointerover

pointerenter

pointerdown

pointermove

pointerup

pointercancel

pointerout

pointerleave

pointerover

pointerenter

pointerdown

pointermove

pointerup

pointercancel

pointerout

pointerleave

**gotpointercapture**

**lostpointercapture**

# **Представлены**

# **Microsoft**



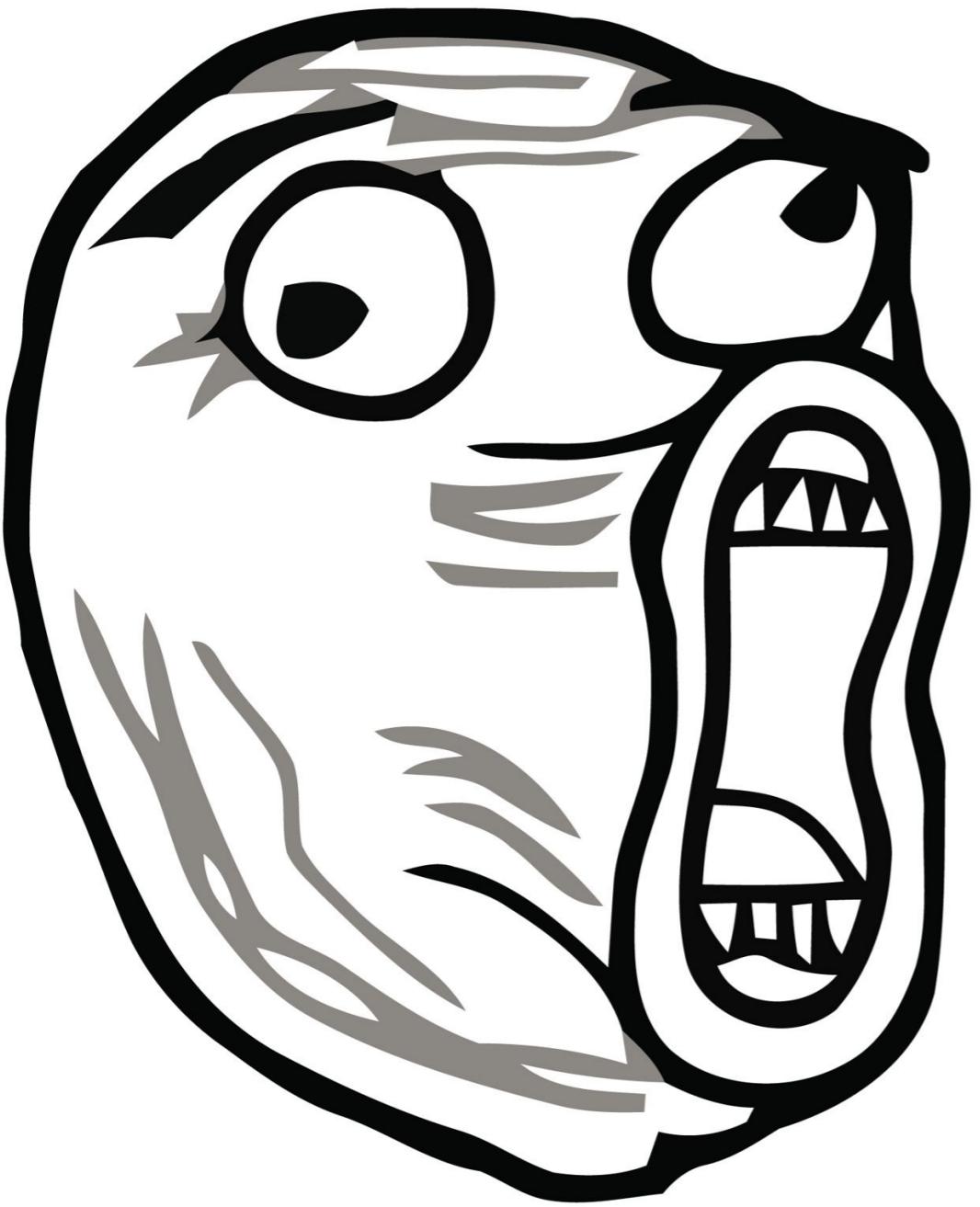
```
window.navigator.pointerEnabled  
// IE11: true
```

```
window.navigator.msPointerEnabled  
// IE10: true
```

```
window.navigator.msPointerEnabled  
// IE11: true
```

**Но события с префиксом ms  
в IE11 не срабатывают**

**Хорошая работа,  
MiscroSoft!**



зачем?  
используй  
click!

mouseenter

mouseover

mousemove

mousedown

focus

mouseup

mouseleave

click

**touchstart**

**touchmove**

**touchend**

mouseenter

mouseover

mousemove

mousedown

focus

mouseup

mouseleave

click

**touchstart**

**touchmove**

**touchend**

## **ЗАДЕРЖКА**

**mouseover**

**mousemove**

**mousedown**

**mouseup**

**click**

**События мыши  
срабатывают только  
при точном прикосновении  
одним пальцем**

mousemove

**pointerover** -> mouseover

**pointerenter** -> mouseenter

**pointerdown** -> mousedown

focus

**pointermove** -> mousemove

**pointerup** -> mouseup

**pointerout** -> mouseout

**pointerleave** -> mouseleave

click

mousemove

**pointerover** -> mouseover

**pointerenter** -> mouseenter

**pointerdown** -> mousedown

focus

**pointermove** -> mousemove

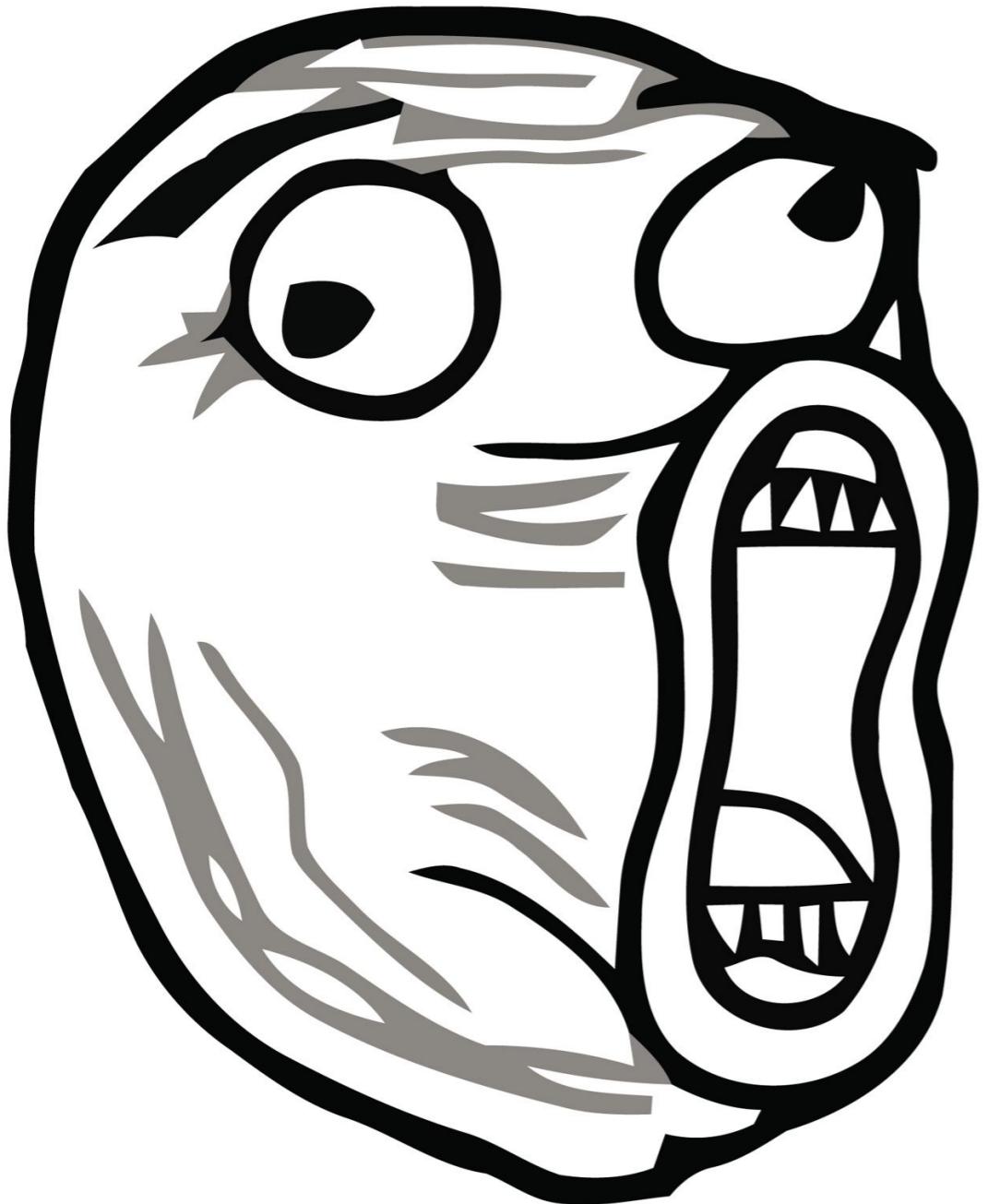
**pointerup** -> mouseup

**pointerout** -> mouseout

**pointerleave** -> mouseleave

## ЗАДЕРЖКА

click



Всего 300 мс?  
Серьезно?

# **Допустимые пределы ожидания**

*при взаимодействии  
с пользователем*

**NN/g**

# До 100 милисекунд

*Максимальный лимит,  
при котором пользователь  
думает, что система  
реагирует мгновенно*

# До 1 секунды

*Максимальный лимит,  
при котором пользователь  
не теряет поток мыслей*

# До 10 секунд

*Максимальный лимит,  
при котором пользователь  
не теряет внимание*

Мгновенная  
реакция  
интерфейса,  
чувство  
полного  
контроля.

Сохранение  
целостности  
потока  
мыслей.  
Индикатор  
желателен.

Сохранение  
внимания  
пользователя.  
Индикатор  
обязателен.

Смена задач  
пользователя.  
Индикатор  
обязателен.

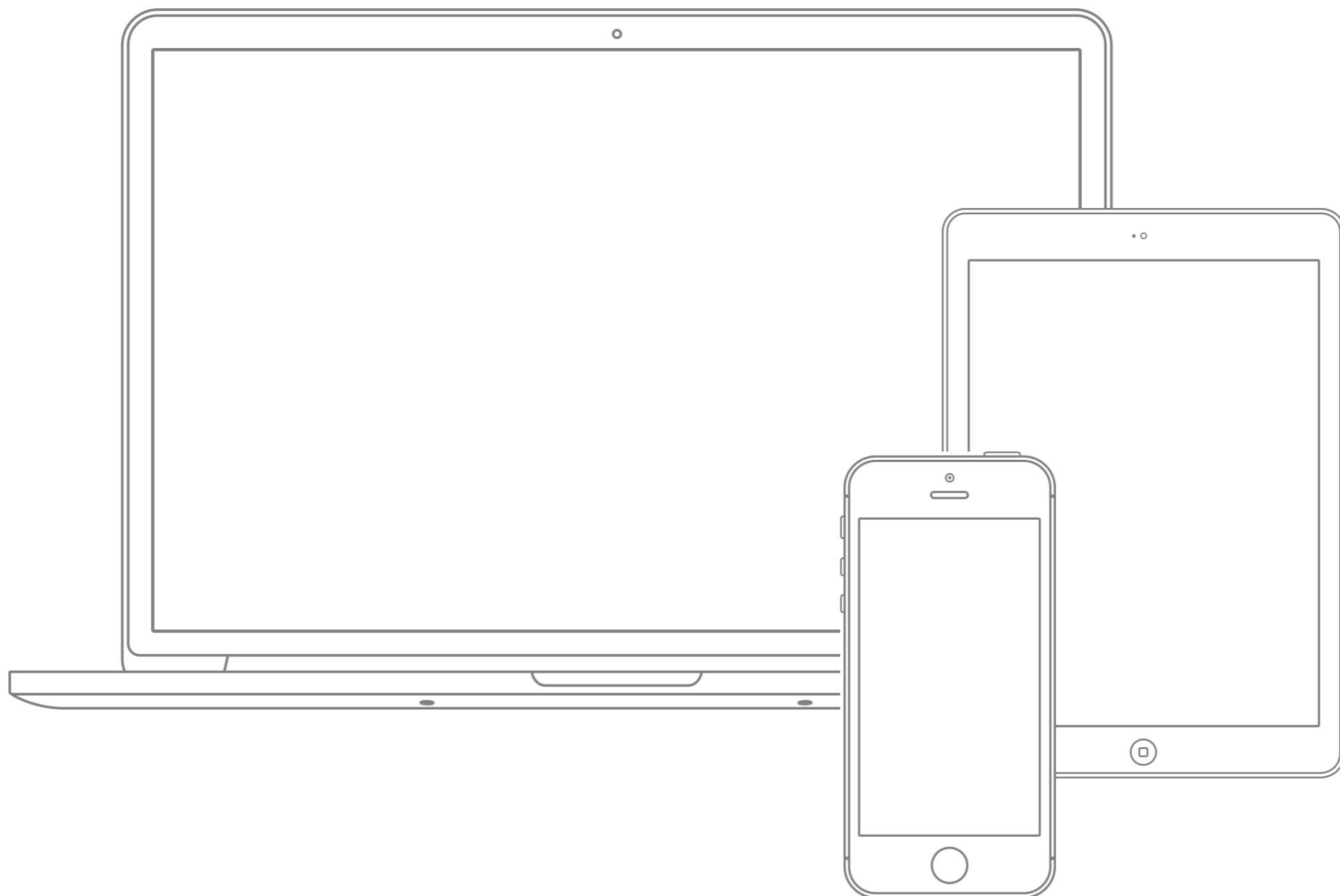


Реакция  
на клик  
мышкой,  
касание  
экрана  
и т.д.

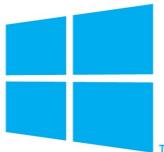


# **Устройства, браузеры и операционные системы**

## *с «занозой»*



 **BlackBerry**

 Windows® 8





# Android



# **Android Browser**



# Chrome



```
<meta  
name="viewport"  
content="width=device-width">
```

# Pointer Events ⚡



---

[#112 fmuad...@gmail.com](#)

Oct 6, 2014

So, let me understand this madness: are we doomed to write our web code 3 times for 3 different APIs because you cannot find a way to provide an unified solution? You must be joking, right? I hope so. Because from outside, this mess appears as nothing less than total incompetence. This is the most damaging "WontFix" ever.

om

nd this madness: are we doomed to write ou  
use you cannot find a way to provide an un  
pe so. Because from outside, this mess app  
This is the most damaging "WontFix" ever.



# chromium

An open-source project to help move the web forward.

[Project Home](#)[Downloads](#)[Wiki](#)[Issues](#)[Code Search](#)[New issue](#)[Search](#)[Open issues](#)

for

[Search](#)[Advanced search](#)

## ★ Issue [162757](#): Implement pointer events in Chrome behind experimental flag

307 people starred this issue.

Comments by non-members will not trigger notification emails to users who starred this issue.

**Status:** WontFix

**Owner:** [rby...@chromium.org](mailto:rby...@chromium.org)

**Closed:** Aug 15

**Cc:** [v...@chromium.org](mailto:v...@chromium.org),  
[skyos...@chromium.org](mailto:skyos...@chromium.org),  
[abarth@chromium.org](mailto:abarth@chromium.org),  
[o...@chromium.org](mailto:o...@chromium.org),  
[peter@chromium.org](mailto:peter@chromium.org),  
[cwi...@chromium.org](mailto:cwi...@chromium.org)

**OS-Android**

**Pri-2**

**ImportantForMobile**

**OS-Chrome**

**OS-Windows**

**Type-Feature**

**Cr-UI-Shell**

**Cr-Blink**

**Project Member** Reported by [smus@chromium.org](mailto:smus@chromium.org), Nov 26, 2012

Tracking bug to implement pointer events in Chrome: <http://www.w3.org/Submi>

[#1 srika...@chromium.org](#)

*(No comment was entered for this change.)*

**Status:** Untriaged

**Labels:** Area-WebKit Feature-Touch

[#2 v...@chromium.org](#)

*(No comment was entered for this change.)*

**Labels:** ImportantForMobile

[#4 rby...@chromium.org](#)

**iOS**



**Safari,  
any other**





# WebKit Bugzilla

Bug 133114: Implement "touch-action:manipulation" Pointer Events CSS property to suppress

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| « First Last » | « Prev Next » | This bug is not in your last search results.

## [Bug 133114](#) - Implement "touch-action:manipulation" Pointer Events CSS property to sup

**Status:** RESOLVED DUPLICATE of [bug 133112](#)

**Reported:**

**Product:** WebKit

**Modified:**

**Component:** HTML Events

**CC List:**

**Version:** 528+ (Nightly build)

**See Also:**

**Platform:** Unspecified Unspecified

**Importance:** P2 Normal

**Assigned To:** Nobody

**URL:** [https://dvcs.w3.org/hg/pointerevents/...](https://dvcs.w3.org/hg/pointerevents/)

**Keywords:**

**Depends on:**

**Blocks:**

Show dependency [tree](#) / [graph](#)

### Attachments

Add an attachment (proposed patch, testcase, etc.)



# WebKit Bugzilla

Bug 133112: Touch-action css property s

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Search

[?]

| [Reports](#) | [Requests](#) | [Help](#) | [New Account](#) | [Log In](#)

| « First Last » | « Prev Next » | This bug is not in your last search results.

## **Bug 133112 - Touch-action css property support**

**Status:** NEW

**Reported:** 2

**Product:** WebKit

**Modified:** 2

**Component:** Event Handling

**CC List:** 6

**Version:** 528+ (Nightly build)

**See Also:**

**Platform:** Unspecified Unspecified

**Importance:** P2 Normal

**Assigned To:** Nobody

**URL:**

**Keywords:**

**Depends on:**

**Blocks:**

Show dependency [tree](#) / [graph](#)

**Attachments**

Benjamin Poulain 2013-10-02 13:39:54 PDT

[Comment 1](#)

The key difference is Android does not support double-tap to scroll. Since there is no second tap to wait for, the synthetic mouse event is generated right away.

# Pointer Events ⚡





# WebKit Bugzilla

Bug 105463: Implement pointer e

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[?]

| [Reports](#) | [Requests](#) | [Help](#) | [New Account](#) | [Log Out](#)| « First Last » | « Prev Next »   *This bug is not in your last search results.*

## Bug 105463 - Implement pointer events

**Status:** RESOLVED WONTFIX

Reported

**Product:** WebKit

Modified

**Component:** HTML Events

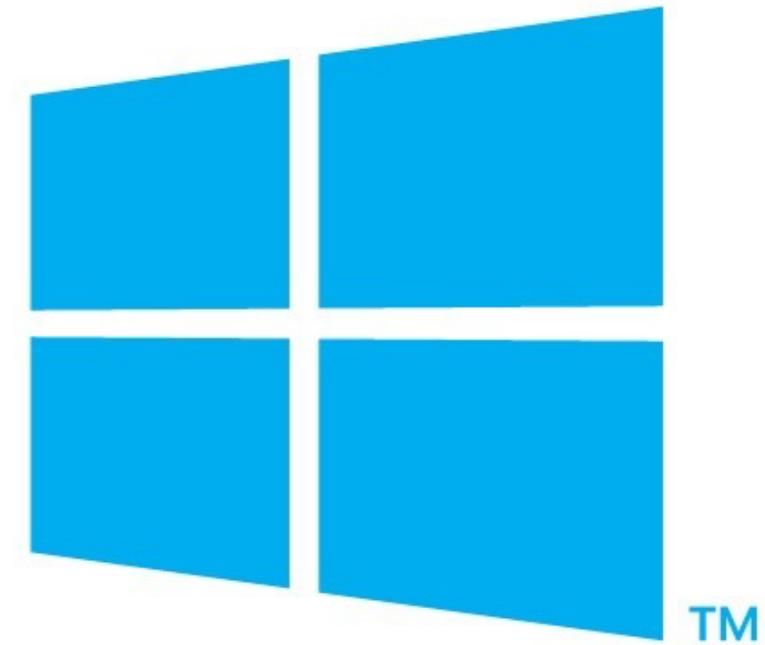
Comments

**Version:** 528+ (Nightly build)

See also

**Platform:** All All**Importance:** P2 Enhancement**Assigned To:** Nobody**URL:** [https://dvcs.w3.org/hg/pointerevents/...](https://dvcs.w3.org/hg/pointerevents/)**Keywords:** WebExposed**Depends on:****Blocks:**Show dependency [tree](#) / [graph](#)

**Windows,  
Win Phone**



# Internet Explorer



```
button {  
    -ms-touch-action: none; /* IE10 */  
    touch-action: none; /* IE11 */  
}
```

```
button {  
    -ms-touch-action: none; /* IE10 */  
    touch-action: none; /* IE11 */  
}
```

*Scroll, zoom, pinch не работают*

`touch-action: manipulation;`



# Touch Events



**Уже сейчас**

**Доверяй,  
но проверяй**

TAP IT

1. Без meta-тегов
2. width=device-width
3. width=device-width  
user-scalable=no

# **Результаты**

Browser	OS	Avg Delay, ms	Event	Tests
Mobile Firefox 29.0	Android	1986	touchend	3
Mobile Firefox 31.0	Android	109	touchend	6
IE 10.0	Windows RT	296	MSPointerUp	3
IE 10.0	Windows 8	1	MSPointerUp	3
IE Mobile 10.0	Windows Phone 8	321	MSPointerUp	3
IE Mobile 10.0	Windows Phone 8	322	MSPointerUp	1
IE Mobile 10.0	Windows Phone 8	315	MSPointerUp	3
Mobile Safari	iOS 5	301	touchend	3
Mobile Safari	iOS 7	468	touchend	3
Mobile Safari	iOS 7	462	touchend	3
Mobile Safari	iOS 7	556	touchend	3
Mobile Safari	iOS 7	475	touchend	3
Mobile Safari 7.0	iOS 7	377	touchend	6
Mobile Safari	iOS 7	471	touchend	3
Mobile Safari 7.0	iOS 7	402	touchend	3
Mobile Safari	iOS 6	388	touchend	3
Mobile Safari	iOS 6	382	touchend	3
Mobile Safari	iOS 7	426	touchend	3
Mobile Safari	iOS 7	442	touchend	3
Mobile Safari	iOS 7	960	touchend	3
Mobile Safari	iOS 7	399	touchend	3
Mobile Safari	iOS 7	394	touchend	3
Mobile Safari 7.0	iOS 7	381	touchend	6

<http://pukhalski.com/tap/results/>

# **Интересные находки**

# **Android Browser**

*Android 4.4*





## Android Browser 4.0

*Android 4.4*

touchend

1. Без meta-тегов: ~300 мс
2. width=device-width: ~300 мс
3. width=device-width  
user-scalable=no: ~300 мс

# Chrome

*Android 4.4*





**Chrome Mobile 36.0**

*Android 4.4*

touchend

1. Без meta-тегов: ~265 мс
2. width=device-width: ~72 мс
3. width=device-width  
user-scalable=no: ~86 мс

**Internet  
Explorer**  
*WP 8.1*





**IE Mobile 11**

*Windows Phone 8.1*

pointerup

1. Без meta-тегов: ~289 мс
2. width=device-width: ~316 мс
3. width=device-width  
user-scalable=no: ~323 мс



**IE Mobile 11**

*Windows RT*

touchend

1. Без meta-тегов: ~310 мс
2. width=device-width: ~296 мс
3. width=device-width  
user-scalable=no: ~13 мс

**Хорошая работа,  
MiscroSoft! x2**

# **Фантомные нажатия**

## *Ghost Clicks*

**touchstart**

**touchmove**

**touchend**

## **ЗАДЕРЖКА**

**mouseover**

**mousemove**

**mousedown**

**mouseup**

**click**

**Случается  
по позиции,  
не по элементу**

	preventDefault()		Ghost click timing		Ghost click coordinates	
	touchstart	touchend	Scalable page	Not scalable page	Scalable page	Not scalable page
Safari Mobile iOS 5.1.1	Yes	Yes	370ms after end	<b>370ms</b> after end	touchstart	touchstart
Safari Mobile iOS 6.1.3	Yes	Yes	370ms after end	<b>370ms</b> after end	touchstart	touchstart
Safari Mobile iOS 7.1.1	Yes	Yes	370ms after end	<b>370ms</b> after end	touchstart	touchstart
Android 2.3.7	Yes	No	410ms after end	<b>410ms</b> after end	touchstart	touchstart
Android 4.0.4	Yes	No	300ms after end	10ms after end	touchstart	touchstart
Android 4.1.2	Yes	No	300ms after end	<b>300ms</b> after end	touchstart	touchstart
Android 4.2.2	Yes	No	300ms after start	10ms after end	touchstart	<b>touchend</b>
IE10 Windows Phone 8	No	No	310ms after end	10ms after end	<b>touchend</b>	<b>touchend</b>
Blackberry 10	Yes	Yes	260ms after end	10ms after end	touchstart	touchstart
Chrome for iOS	Yes	Yes	360ms after end	<b>360ms</b> after end	touchstart	touchstart
Chrome for Android	Yes	Yes	300ms after start	10ms after end	touchstart	<b>touchend</b>
Firefox for Android	Yes	No	300ms after end	10ms after end	touchstart	<b>touchend</b>

<http://ariatemplates.com/blog/2014/05/ghost-clicks-in-mobile-browsers/>

`preventDefault()` на:

- **touchstart** – невозможно скролить с этого элемента
- **touchend** – срабатывает в малом кол-ве браузеров

# **Решения**

# FastClick

*om FT Labs*

GitHub, Inc.

This repository Search

Explore Gist Blog Help

pukhalski + ⌂ ⌐ ⌒

ftlabs / fastclick

Watch 390 Star 7,843 Fork 1,102

Polyfill to remove click delays on browsers with touch UIs

356 commits 4 branches 18 releases 33 contributors

branch: master fastclick / +

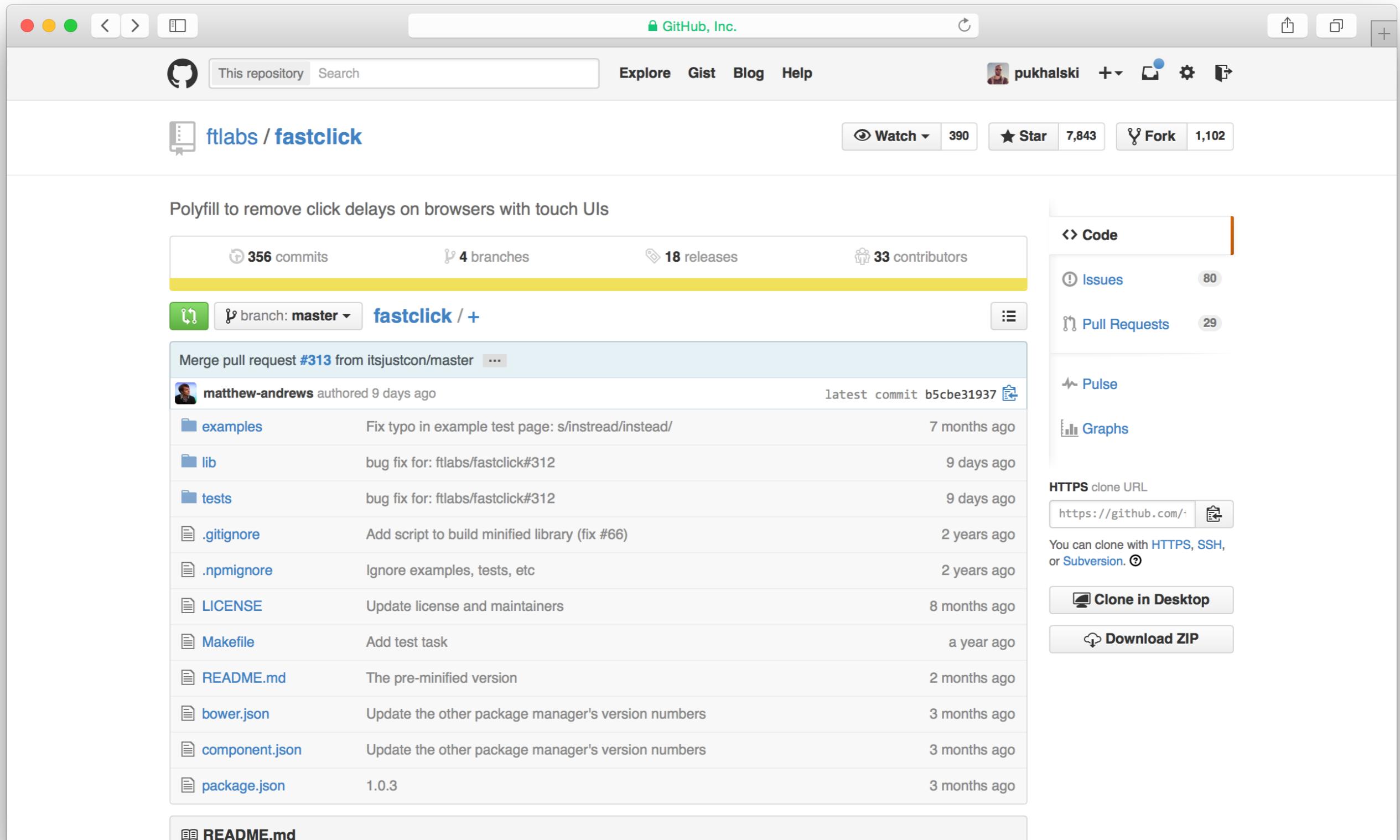
Merge pull request #313 from itsjustcon/master ...  
matthew-andrews authored 9 days ago latest commit b5cbe31937

File	Description	Time
examples	Fix typo in example test page: s/ininstead/instead/	7 months ago
lib	bug fix for: ftlabs/fastclick#312	9 days ago
tests	bug fix for: ftlabs/fastclick#312	9 days ago
.gitignore	Add script to build minified library (fix #66)	2 years ago
.npmignore	Ignore examples, tests, etc	2 years ago
LICENSE	Update license and maintainers	8 months ago
Makefile	Add test task	a year ago
README.md	The pre-minified version	2 months ago
bower.json	Update the other package manager's version numbers	3 months ago
component.json	Update the other package manager's version numbers	3 months ago
package.json	1.0.3	3 months ago

HTTPS clone URL  
<https://github.com/>

You can clone with [HTTPS](#), [SSH](#), or [Subversion](#).

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<https://github.com/ftlabs/fastclick>

```
FastClick.attach(document.body);
```

Не поддерживает

Pointer Events

# Polymer Gestures

*om Polymer*

Screenshot of a GitHub repository page for `Polymer / polymer-gestures`.

The page shows the following statistics:

- 126 commits
- 9 branches
- 12 releases
- 6 contributors

The current branch is `master`. The commit history is as follows:

File / Commit Message	Author	Date
add manual test for ghost focus	azakus	17 hours ago
conf audit license headers	azakus	2 months ago
samples move sample to test folder as a manual test		9 days ago
src Make sure to use event path for gesture spinup if available on iOS		4 days ago
test add manual test for ghost focus		17 hours ago
.gitignore Call up for a mouse that disappeared		7 months ago
Gruntfile.js audit license headers		2 months ago
README.md Merge pull request #55 from forresto/patch-2		23 days ago
banner.txt update grunt build		2 months ago
bower.json Fix bower config to install into polymer-gestures folder		3 months ago
build.json added pinch to build.json, updated readme		2 months ago
package.json update package.json		3 months ago
polymer-gestures.html Use a per-element gesture registration system.		3 months ago
polymer-gestures.js Ported pinch gesture		2 months ago

On the right side, there are links to `Code`, `Issues` (21), `Pull Requests` (8), `Wiki`, `Pulse`, and `Graphs`. There is also a `HTTPS clone URL` field containing `https://github.com/Polymer/polymer-gestures`, and buttons for `Clone in Desktop` and `Download ZIP`.

<https://github.com/Polymer/polymer-gestures>

```
PolymerGestures  
.addEventListener(  
  element,  
  'tap',  
  handler,  
  capture);
```

Элемент  
или родитель  
должны иметь  
**touch-action=none**

**ТАР**

*от нас вам*

GitHub, Inc.

This repository Search

Explore Gist Blog Help

pukhalski + ⚙️ ↗

**pukhalski / tap**

Unwatch 12 Unstar 256 Fork 10

1Kb library for easy unified handling of user interactions such as mouse, touch and pointer events.  
<https://github.com/pukhalski/tap/archive/master.zip> — Edit

48 commits 2 branches 0 releases 5 contributors

branch: master tap / +

Merge pull request #10 from jimbog/patch-1 ...  
pukhalski authored 3 minutes ago latest commit 43bed0c6d6

File	Description	Time
dist	No mercy for legacy browsers, `Tap.options` added	a month ago
src	No mercy for legacy browsers, `Tap.options` added	a month ago
.gitignore	No mercy for legacy browsers, `Tap.options` added	a month ago
Gruntfile.js	No mercy for legacy browsers, `Tap.options` added	a month ago
LICENSE.md	README and LICENSE updates	6 months ago
README.md	add Meteor instructions	10 days ago
bower.json	Use dist directory instead of build	2 months ago
package.json	Divide library into several files	2 months ago

README.md

**TAP.JS**

Code Issues Pull Requests Wiki Pulse Graphs Settings

HTTPS clone URL  
<https://github.com/>

You can clone with [HTTPS](#), [SSH](#), or [Subversion](#).

Clone in Desktop Download ZIP

<https://github.com/pukhalski/tap>

```
document.getElementById('any-element')
.addEventListener('tap', function (e) {
    // All the magic happens here
});
```

```
$('any-element')
.on('tap', function (e) {
    // All the magic happens here
});
```

**И напоследок...**

Волнуетесь об опыте  
пользовательского  
взаимодействия  
и впечатлении пользователя?

Не обходите эту проблему  
стороной

@pukhalski

