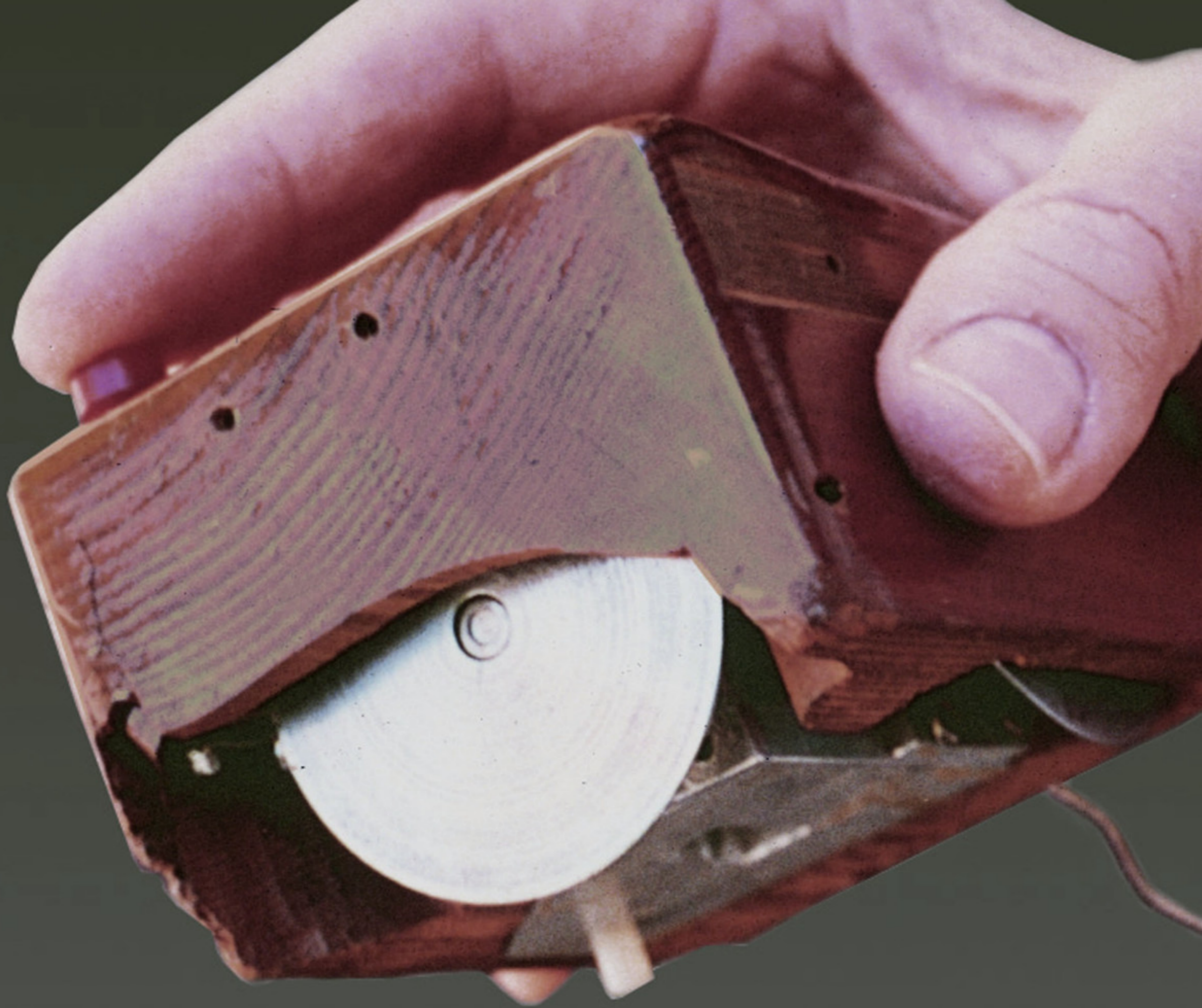


**Все те же 300 мс,**

*или как мелочи могут стать  
большой занозой в браузере*

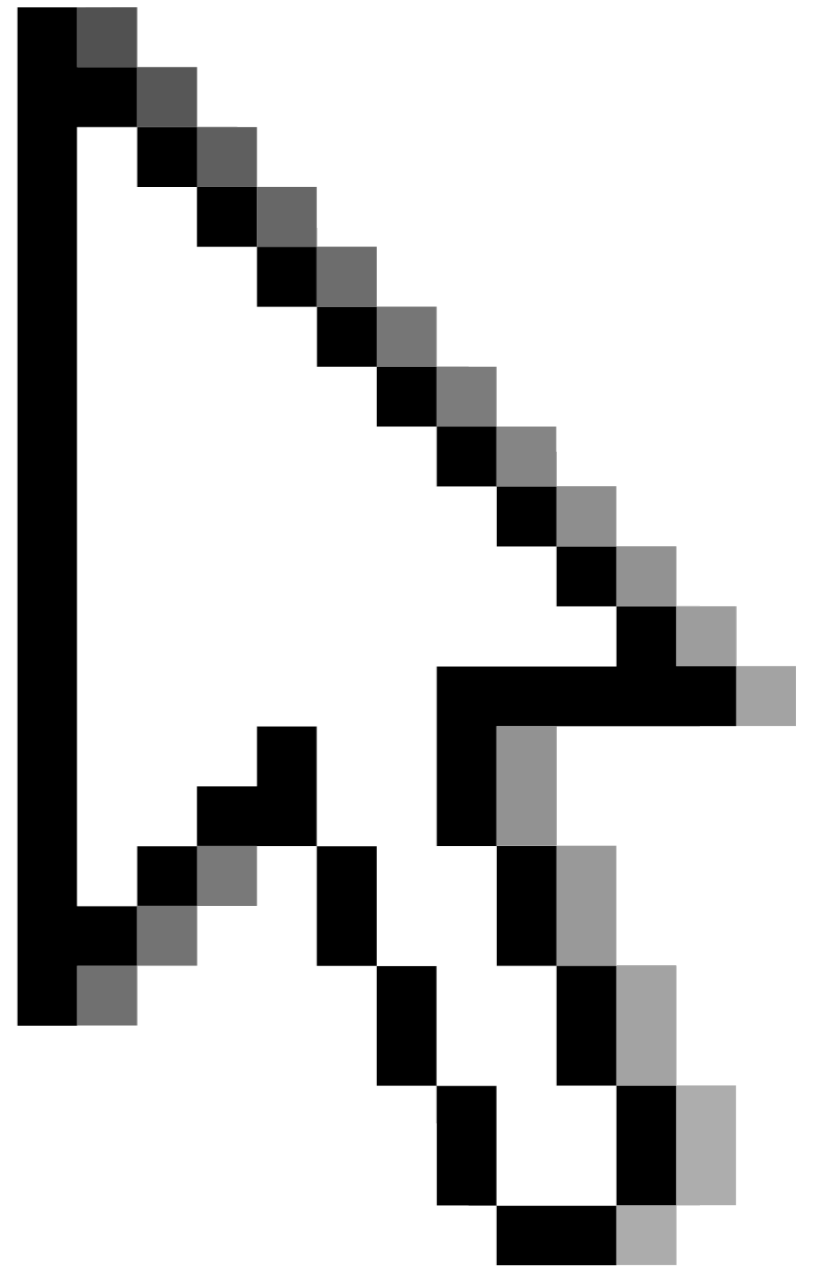
@pukhalski





**МЫШЬ**

*mouse events*



mousedown

mouseup

mousemove

mouseover

mouseout

mousedown

mouseup

mousemove

mouseover

mouseout

**click**

mousedown

mouseup

mousemove

mouseover

mouseout

**click**

mouseenter\*

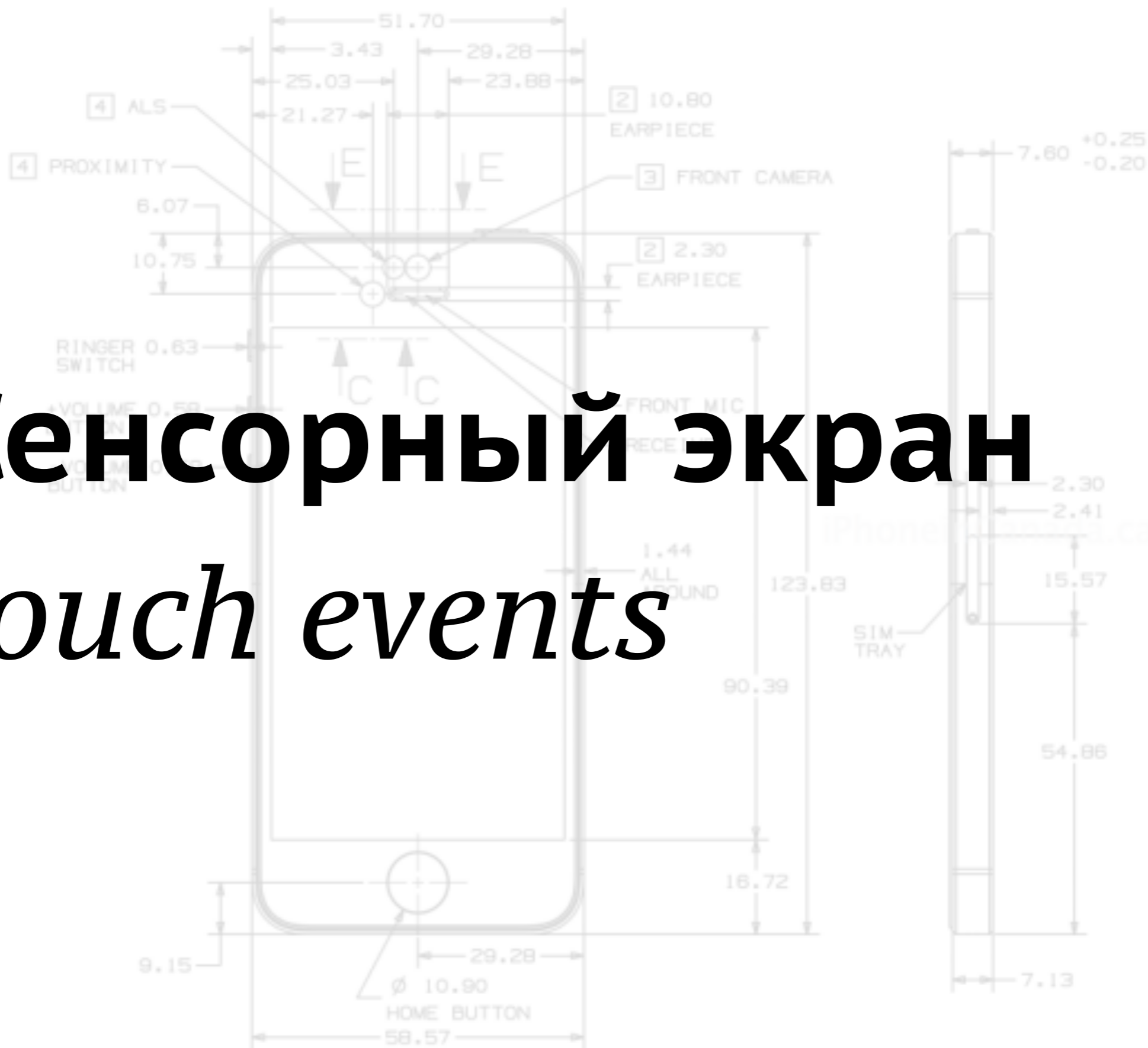
mouseleave\*





**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



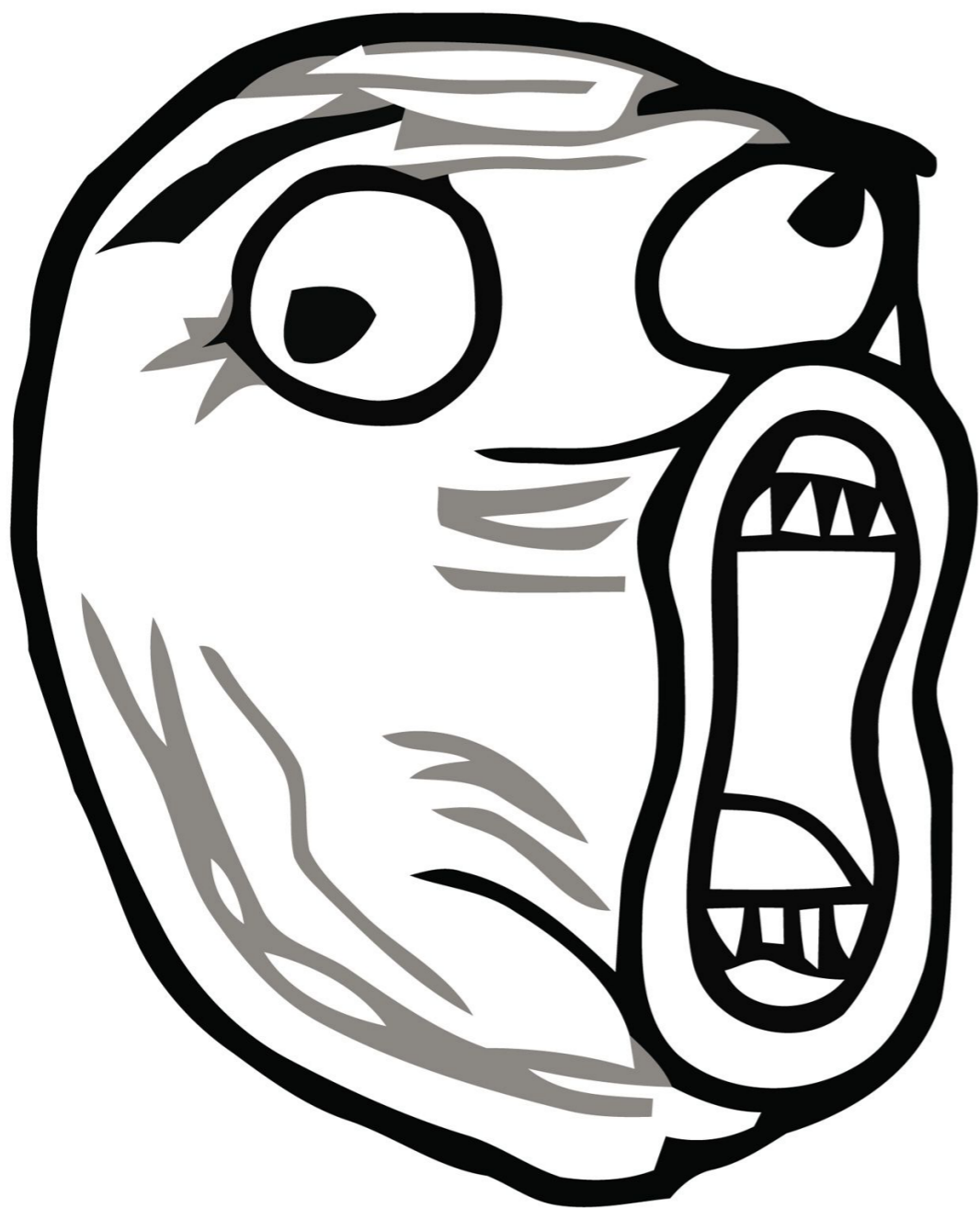
```
window.navigator.pointerEnabled  
// IE11: true
```

```
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

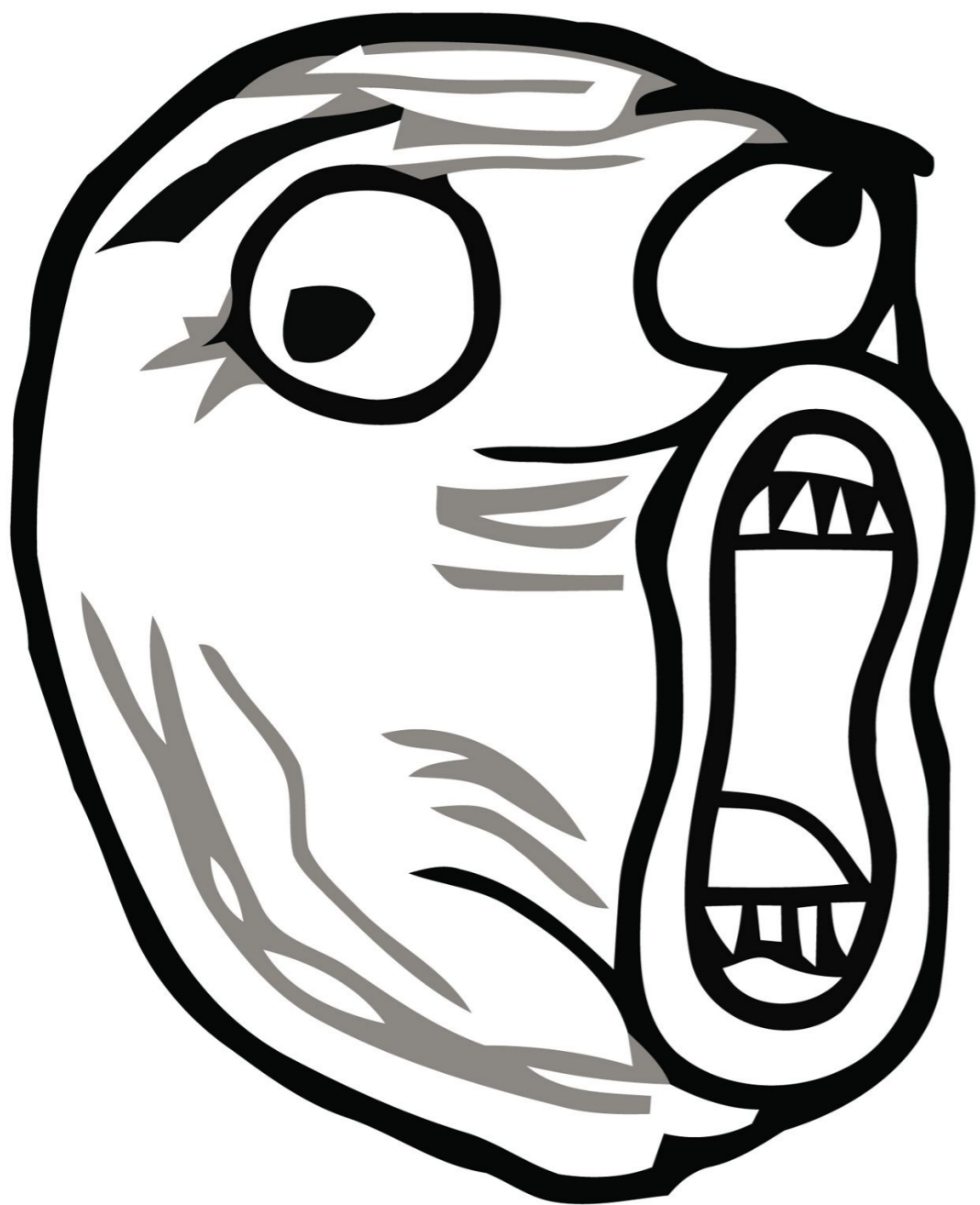
**pointerup** -> mouseup

**pointerout** -> mouseout

**pointerleave** -> mouseleave

**ЗАДЕРЖКА**

click



**Всего 300 мс?  
Серьезно?**

**Допустимые  
пределы ожидания**  
*при взаимодействии  
с пользователем*

**NN/g**



**До 100 миллисекунд**

*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.



**< 0.1**



**0.1-1**



**1-10**



**> 10**

*секунды*

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



**< 0.1**



**0.1–1**



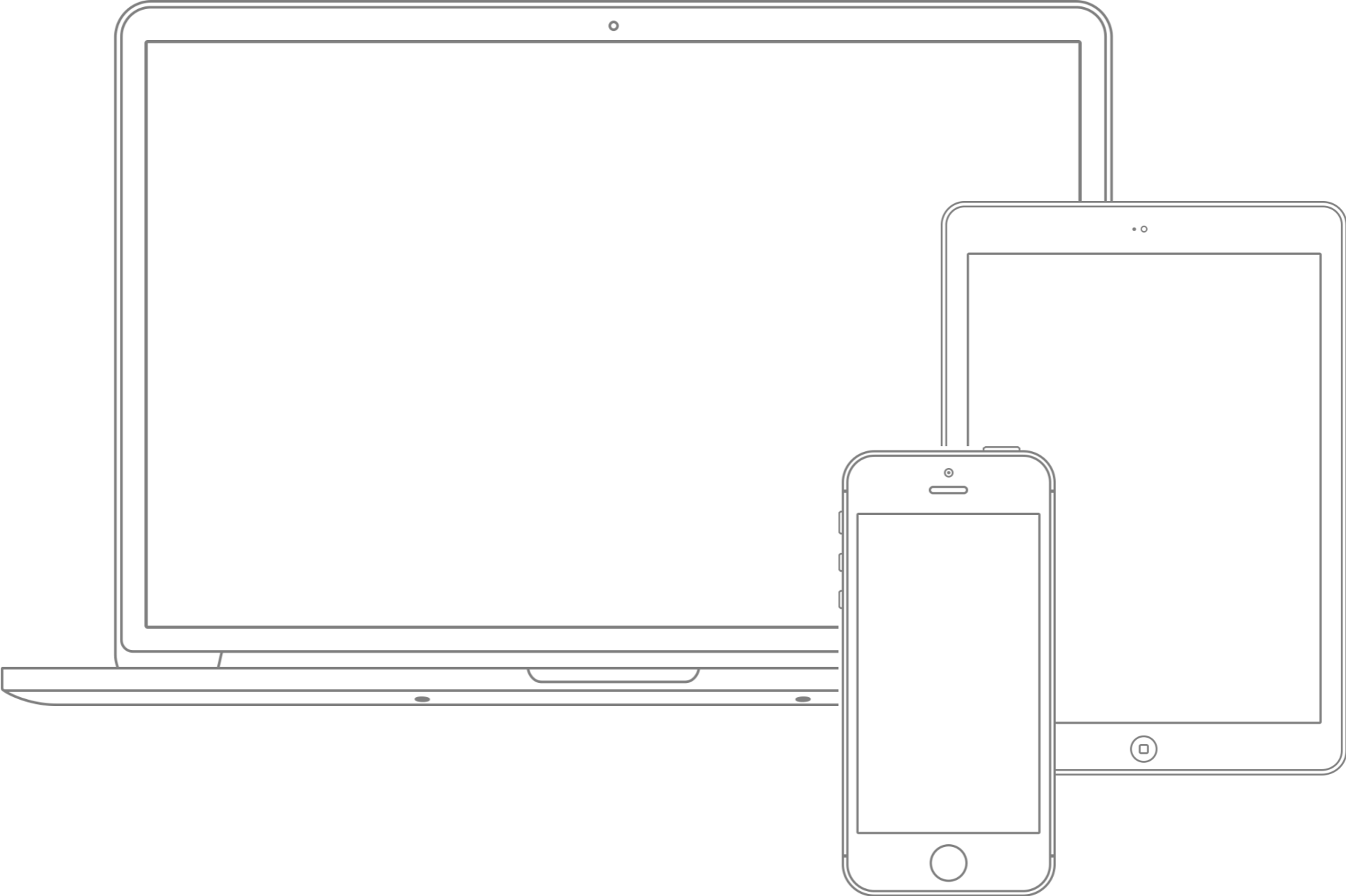
**1–10**



**> 10**

*секунды*

**Устройства, браузеры  
и операционные системы  
с «занозой»**



 **BlackBerry**

 **Windows<sup>®</sup> 8**







# Android



# Android Browser



**Chrome**



```
<meta
```

```
  name="viewport"
```

```
  content="width=device-width" >
```

# Pointer Events $\theta$



---

[#112 fmuad...@gmail.com](mailto:#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.

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**Issues**

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Search

Open issues



for

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## ★ 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](#)

**Closed:** Aug 15

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

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

**Product:** WebKit

**Component:** HTML Events

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

**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](#)

**Reported:**

**Modified:**

**CC List:**

**See Also:**

### Attachments

[Add an attachment](#) (proposed patch, testcase, etc.)



# WebKit Bugzilla

Bug 133112: Touch-action css property s

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## **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)

**Platform:** Unspecified Unspecified

**See Also:**

**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 $\theta$





# WebKit Bugzilla

Bug 105463: Implement pointer e

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## **Bug 105463 - Implement pointer events**

**Status:** RESOLVED WONTFIX

**Product:** WebKit

**Component:** HTML Events

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

**Platform:** All All

**Importance:** P2 Enhancement

**Assigned To:** Nobody

**URL:** <https://dvcs.w3.org/hg/pointerevents/...>

**Keywords:** WebExposed

**Depends on:**

**Blocks:**

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

**Rep**

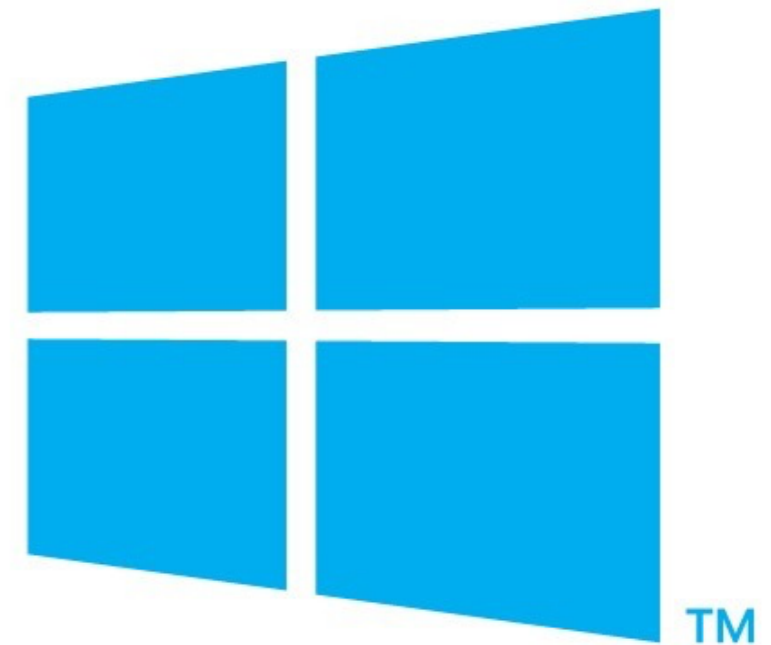
**Mod**

**C**

**See**



**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  $\theta$**



**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	<b>No</b>	410ms after end	<b>410ms</b> after end	touchstart	touchstart
Android 4.0.4	Yes	<b>No</b>	300ms after end	10ms after end	touchstart	touchstart
Android 4.1.2	Yes	<b>No</b>	300ms after end	<b>300ms</b> after end	touchstart	touchstart
Android 4.2.2	Yes	<b>No</b>	300ms after <b>start</b>	10ms after end	touchstart	<b>touchend</b>
IE10 Windows Phone 8	<b>No</b>	<b>No</b>	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 <b>start</b>	10ms after end	touchstart	<b>touchend</b>
Firefox for Android	Yes	<b>No</b>	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  
скроллить 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

examples	Fix typo in example test page: s/instead/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

README.md

Code Issues 80 Pull Requests 29 Pulse Graphs

HTTPS clone URL  
https://github.com/ftlabs/fastclick

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*



GitHub, Inc.

This repository Search Explore Gist Blog Help pukhalski

### Polymer / polymer-gestures

Watch 49 Star 44 Fork 13

126 commits 9 branches 12 releases 6 contributors

branch: master polymer-gestures / +

add manual test for ghost focus  
azakus authored 17 hours ago latest commit 92fde4e1d1

conf	audit license headers	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

Code

Issues 21

Pull Requests 8

Wiki

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HTTPS clone URL

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

You can clone with HTTPS, SSH, or Subversion.

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

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

Элемент

или родитель

должны иметь

**touch-action=none**

**TAP**

*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

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 2 Pull Requests 0 Wiki Pulse Graphs Settings

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

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

