

# Measuring Performance

is your site as fast as you think?



# which is fastest?

ALT.NET SESSION NIGHT 2014.2

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NIGHT

alt.net

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## Learning ASP.NET

ASP.NET is a free web framework for building web sites, apps and services with HTML, CSS and JavaScript.

Learn more >

Meet ASP.NET

Host 10 ASP.NET websites for free. Deploy in seconds to Microsoft Azure. Start for free & scale as your traffic grows. [Learn more >](#)

Announcements Visual Studio 2014

Community spotlight Razor views pre-compilation with ASP.NET 5 and MVC 6

asp.net

YouTube

What to Watch

GEICO Insurance

Watch 'The Interview'

Best News Highlights 2014

Merry Christmas

youtube

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Get started - it's free.

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First name Last name

Email address

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- Smart watches
- Wholesale headlamps
- Magnesium toys for...
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- Heart lockets neck...
- Bakery perfume
- Spa gift cards
- Puffer vest
- Turtleneck sweaters

Man: Slain cops 'should have been white'

Amazing 'Wheel Of Fortune' Guess Helps Break Show Record

10 Beloved Actors Who Tragically Ended Their Lives - Listverse

yahoo

Welcome to Wikipedia,

the free encyclopedia that anyone can edit.

4,878,833 articles in English

From today's featured article

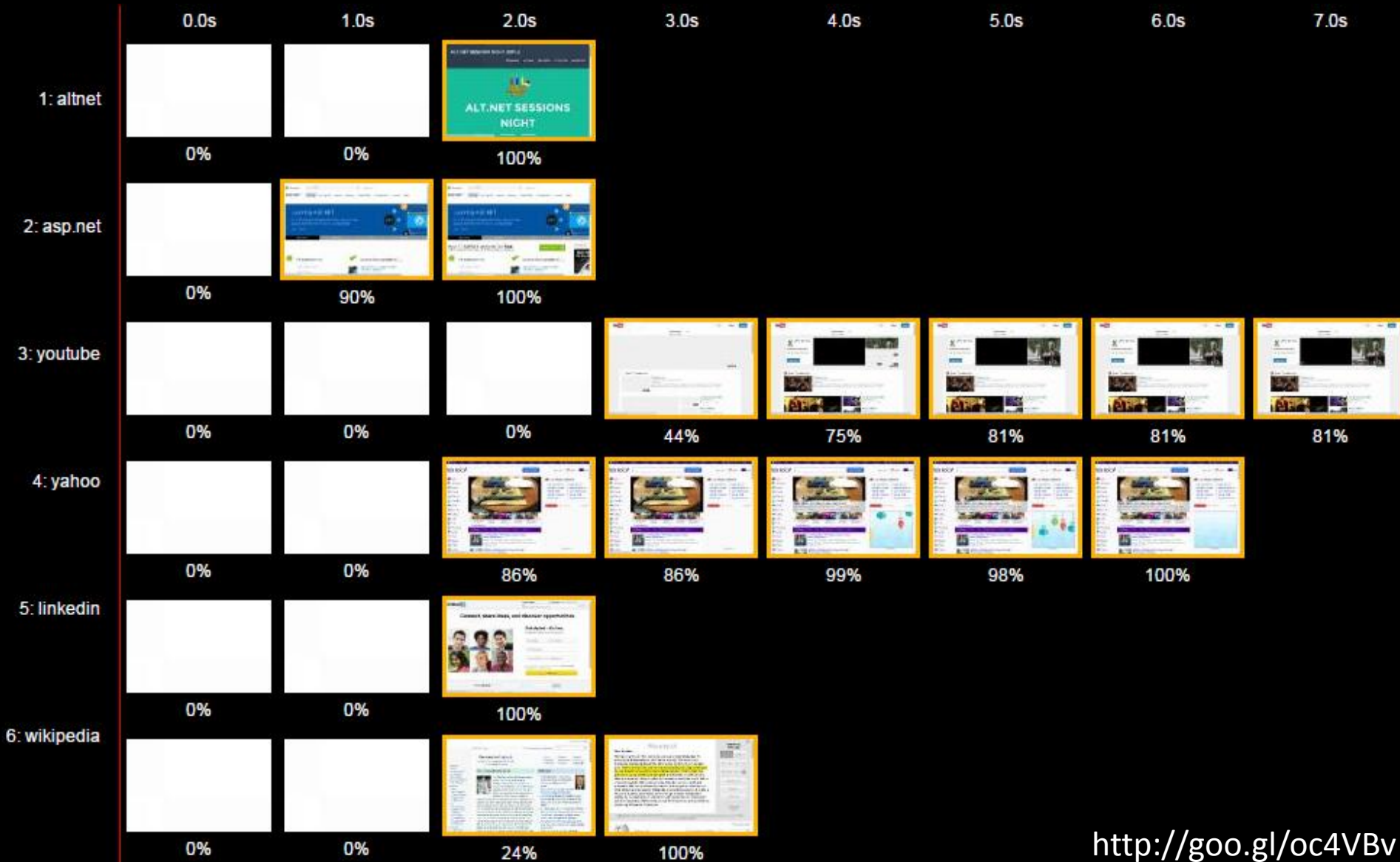
The First Test of the 1948 Ashes series, held at The Oval in London from 14–18 August, was the first Test match in a cricket series between Australia and England. Australia won the match by an innings and 149 runs to complete a 4–0 series win, it was the last Test in the career of Australian captain Donald Bradman (pictured), generally regarded as the best batsman in the history of the sport. After a delayed start due to inclement weather, the Australian fast bowlers, led by Ray Lindwall, took 6 of England's wickets within the first day of the match, England scoring only 52 runs. When Bradman came out to bat, he received a standing ovation from the crowd and three cheers from his opponents. He reached only four runs from his first innings to have a Test batting average of exactly 100, but he failed to score and was out in the second ball he faced (pounded by leg spinner Eric Hollies). The match was followed by applause from both captains, after which the crowd

In the news

- A military attack on twelve-1000 people and subsequent retaliations in Anshan, India kill at least 85 people.
- Buy-Only Escorts (pictured) wins the Tunisian presidential election.
- India's Gas-agriculture Safe-life Launch Vehicle KM-III successfully completes its first flight, carrying the crew vehicle demonstrator CARE.
- U.S. aid worker Alan Gross and three members of the Cuban Five are released by Cuba and the United States, respectively, as both nations move to resume diplomatic relations.
- In an effort to curtail the rapid decline of the rufous, the Central Bank of Russia raises interest rates to 17%.
- At least 147 people are killed as Taliban

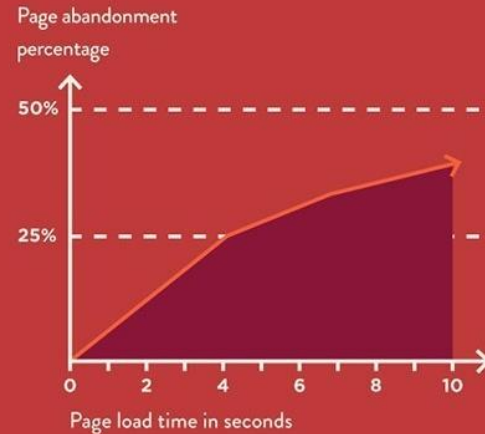
wikipedia

# and the results are in



# Why invest in a fast site?

9%  
1 IN 4 PEOPLE ABANDON A WEB PAGE THAT TAKES MORE THAN FOUR SECONDS TO LOAD.



Amazon.com makes about \$67 million in sales each day.

IT COULD POTENTIALLY LOSE UP TO \$1.6 BILLION PER YEAR BECAUSE OF A 1 SECOND WEB PAGE DELAY.



<http://goo.gl/nBhm7H>

<http://flic.kr/p/mrr1qo>



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[blog.cowchimp.com](http://blog.cowchimp.com)  
[@cowchimp](https://twitter.com/cowchimp)





- Just around the corner
- We build shopyourway.com
- Serverside is (mainly) .net
- **Hiring!!!**



# MEASUREMENT

*“No science attains maturity until it acquires methods of measurement”*

- Dr. Logan Clendening



(science wins!)

User Experience =

Serverside +

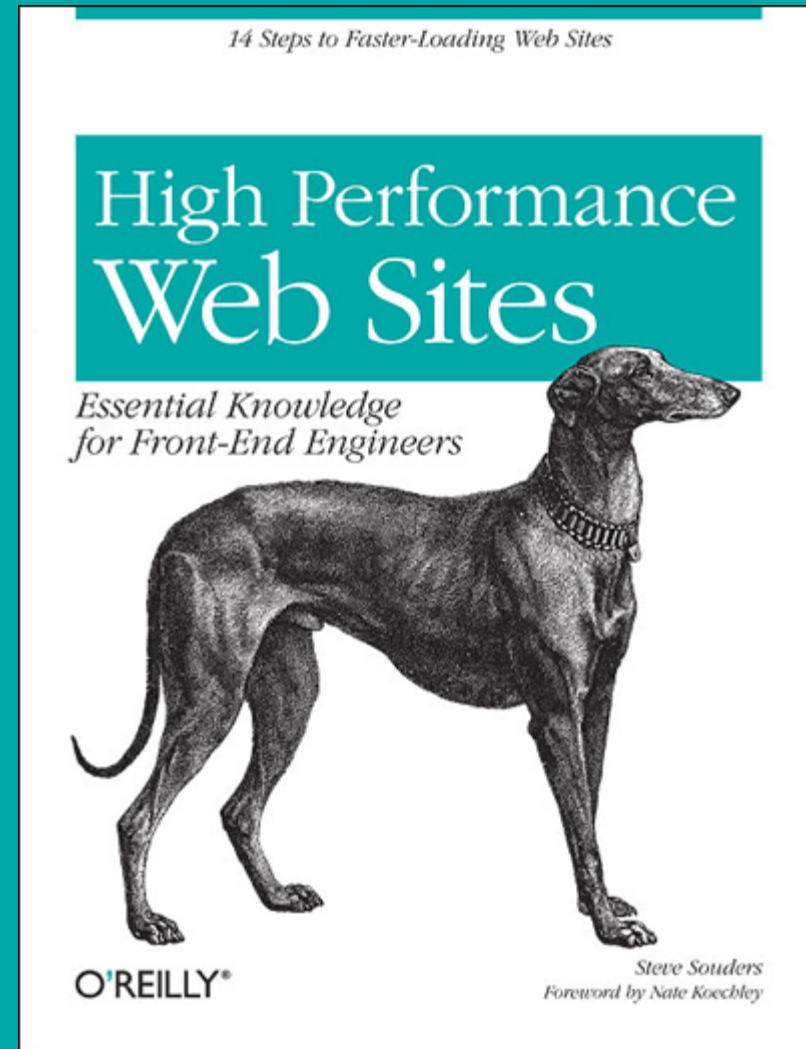
Clientside



*Only 10-20% of the end user response time is spent downloading the HTML document.*

*The other 80-90% is spent downloading all the components on the page.*

*- Steve Souders*



<http://goo.gl/2kjAf8>

*"High Performance Web Sites" (O'Reilly)*

# Metrics

We need to be consistent in

- What point in time?
- What is the cache status?
- What machine do we use?  
(location, connection, browser)
- Based on how many samples?

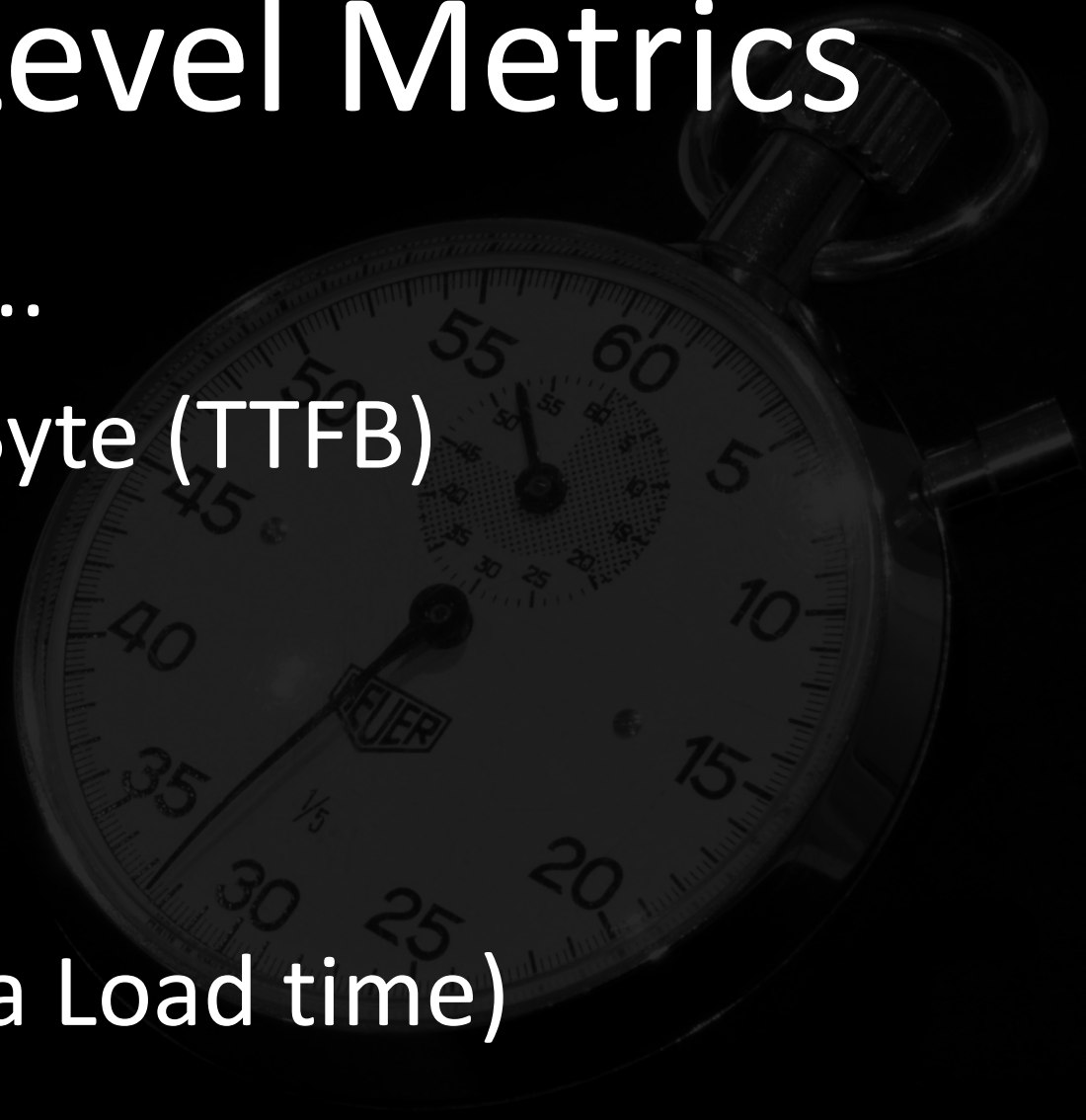
# Example Metric

- $x$  = Page load time - Navigation start time
- Of cached view
- As measured by Webpagetest
- Running a Chrome with a DSL connection in Virginia

# Top Level Metrics

from start until...

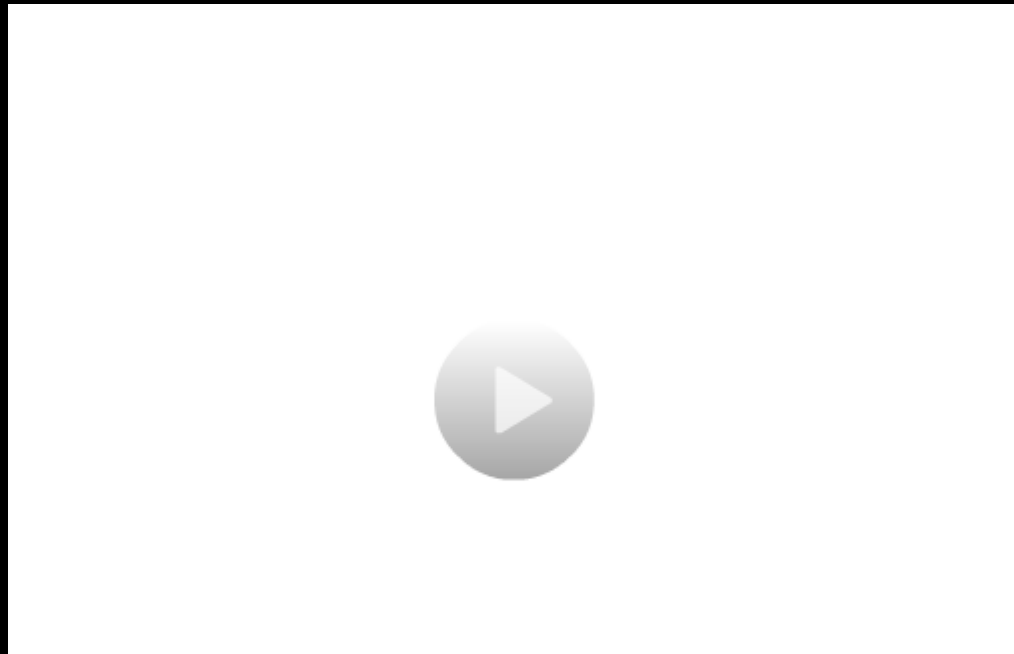
- Time to First Byte (TTFB)
- Start Render
- Page Load (aka Load time)



# Good enough?

- These metrics do a good job at measuring generic **network\browser** events
- But do they do a good job of reflecting the **User Experience?**





0.0

The reported Load time for this page is 3.959s

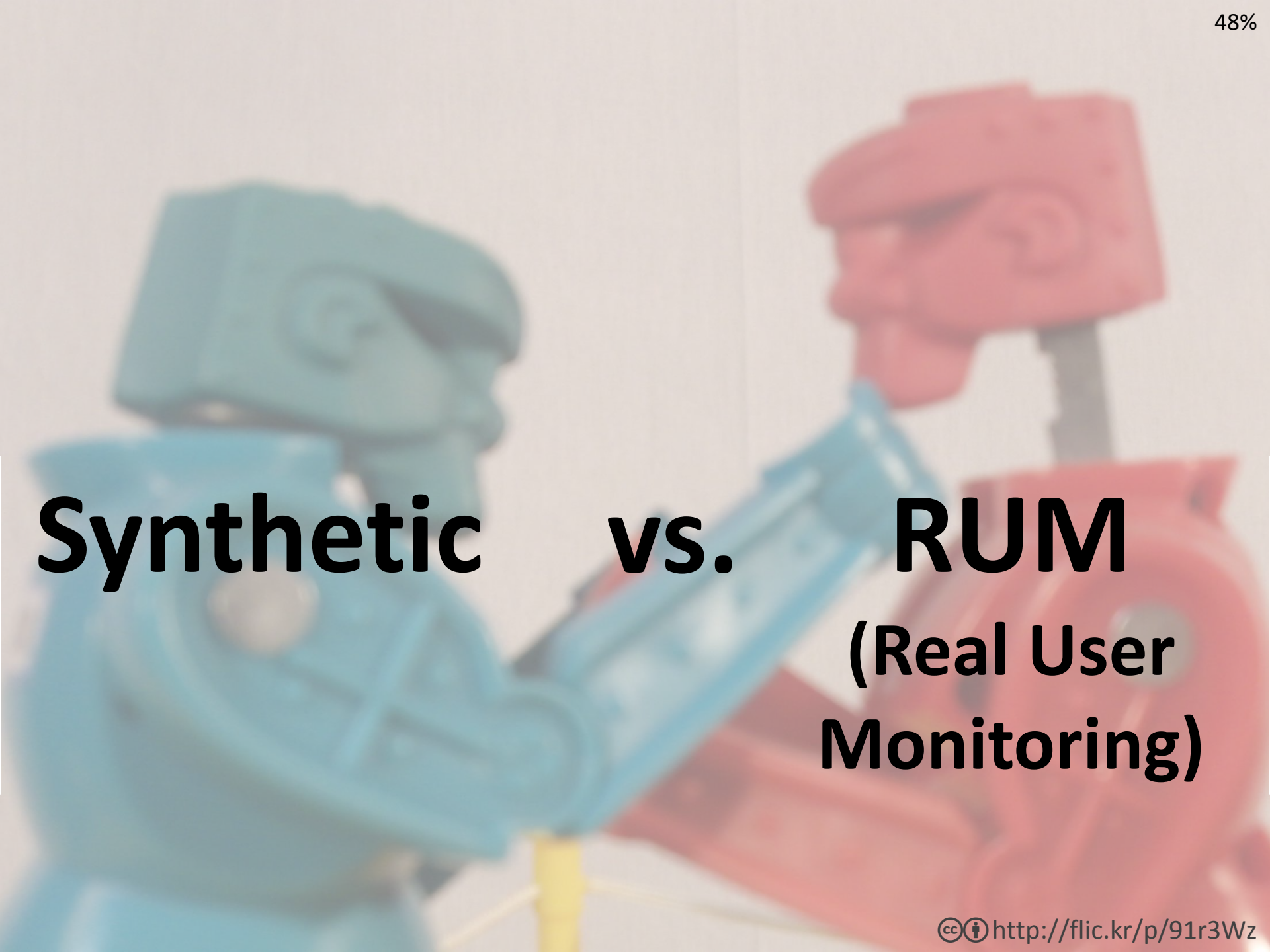
# Perceived Performance



# Monitoring







**Synthetic vs. RUM**  
**(Real User Monitoring)**

# Webpagetest.org (WPT)



[HOME](#) [TEST RESULT](#) [TEST HISTORY](#) [FORUMS](#) [DOCUMENTATION](#) [ABOUT](#)

## Test a website's performance

[Analytical Review](#) [Visual Comparison](#) [Traceroute](#)

Test Location:  [Select from Map](#)

Browser:

[Advanced Settings](#) ▶

1 run, Cable connection, results are public

[START TEST](#)



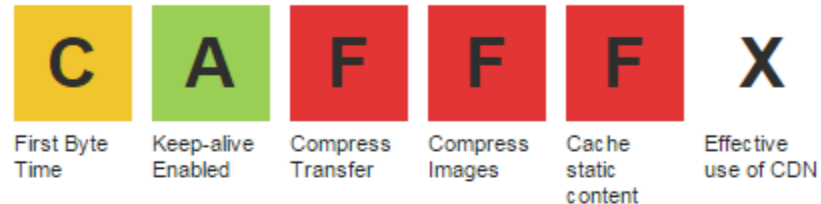
Rick Viscomi,  
Andy Davies & Marcel Duran

# Web Page Performance Test for

[www.hbo.com/#/](http://www.hbo.com/#/)

From: Dulles, VA - Chrome - Cable  
6/17/2014, 9:04:59 PM

[Need help improving?](#)

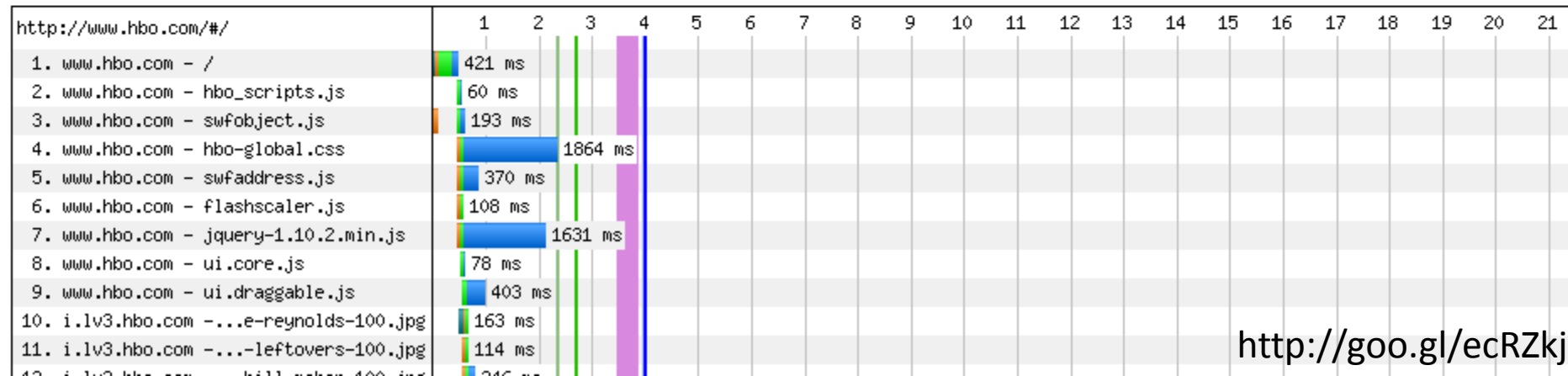


Tester: IE9102-192.168.101.92  
First View only  
Test runs: 3

[Export HTTP Archive \(.har\)](#)

Load Time	First Byte	Start Render	Visually Complete	Speed Index	DOM Elements	Result (error code)	Document Complete			Fully Loaded		
							Time	Requests	Bytes In	Time	Requests	Bytes In
3.959s	0.341s	2.690s	22.400s	18126	139	0	3.959s	104	1,664 KB	21.427s	175	7,883 KB

## Waterfall View



<http://goo.gl/ecRZkj>

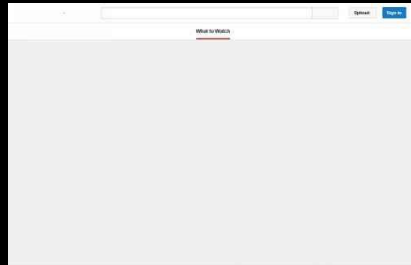
# Video frame analysis

WPT captures screenshots at 10 frames / 1 sec

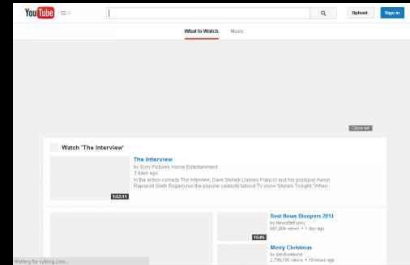
0.0 s



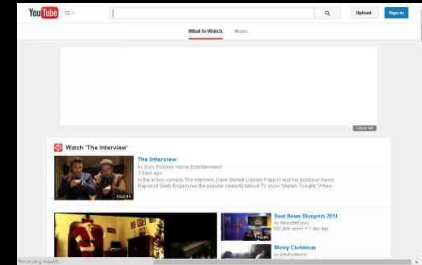
2.2 s



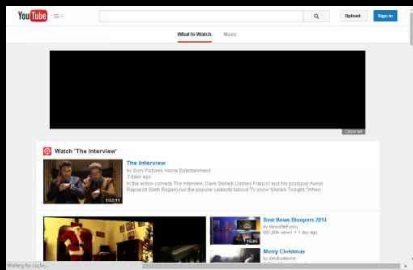
2.8 s



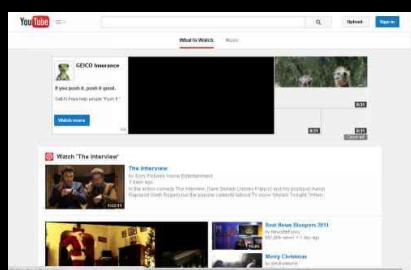
3.3 s



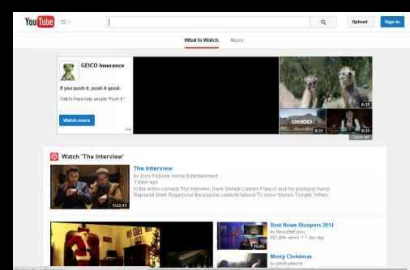
3.6 s



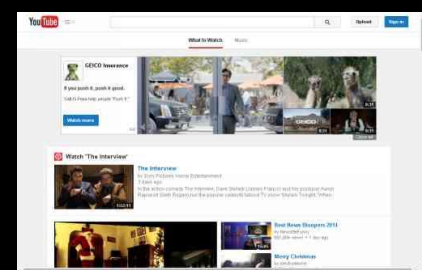
4.0 s



4.2 s

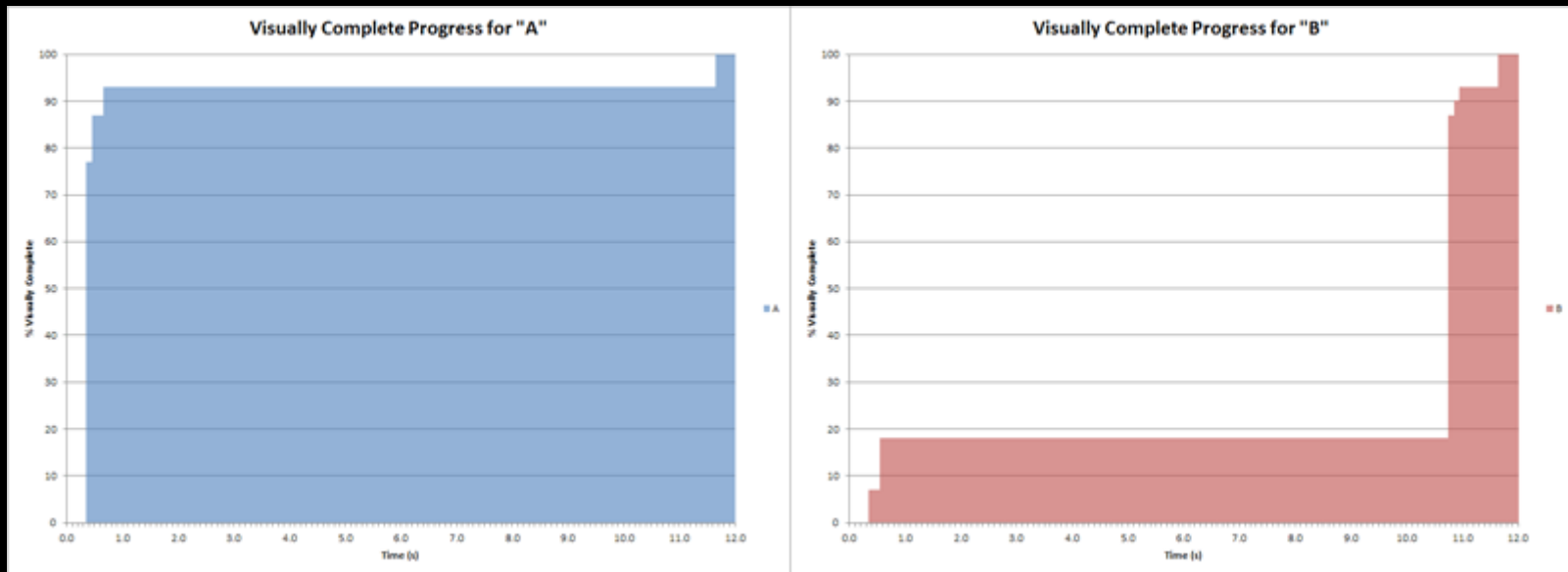


7.6 s



# Video frame analysis

For each frame it calculates % of visual completeness compared the last frame



# “Speed Index”

- New metric defined by WPT
- **Provides an excellent representation of the User Experience**
- Aggregates the visual completeness score of all frames into 1 final score

# Webpagetest API

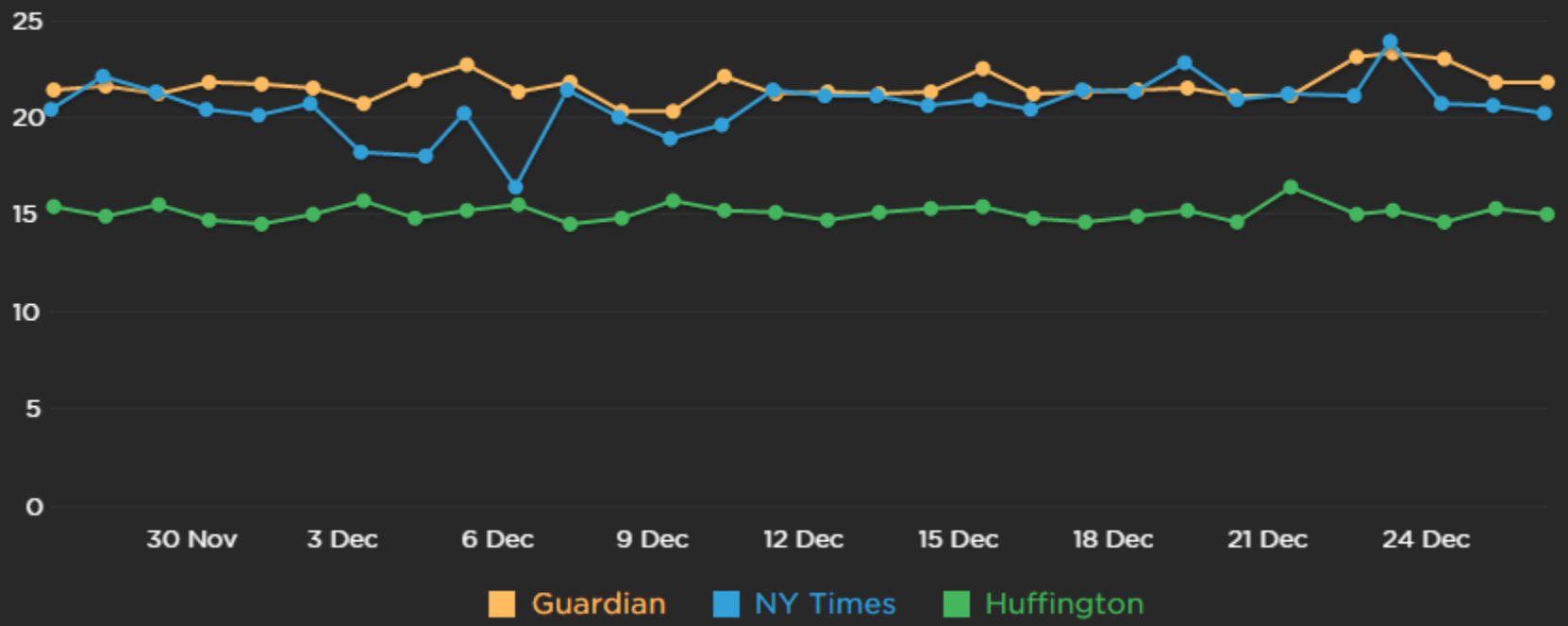
Exposes all  
of WPT's  
functionality  
via HTTP API



[webpagetest.org/getkey.php](http://webpagetest.org/getkey.php)

# SpeedCurve

MEDIAN FULLY LOADED TIME | BACKEND | START RENDER | DOM | FULLY LOADED | SPEEDINDEX





# RUM

## Real User Monitoring



# Poor Man's RUM

```
var startDate = new Date().getTime();
$(window).on('load', function() {
  var endDate = new Date().getTime();
  var diff = endDate - startDate;
  $.ajax('/-/my-rum-endpoint', {
    url: window.location.href,
    pageLoad: diff
  });
});
```



# 3rd party

Open source



YAHOO!  
Boomerang

HubSpot  
Bucky

Commercial

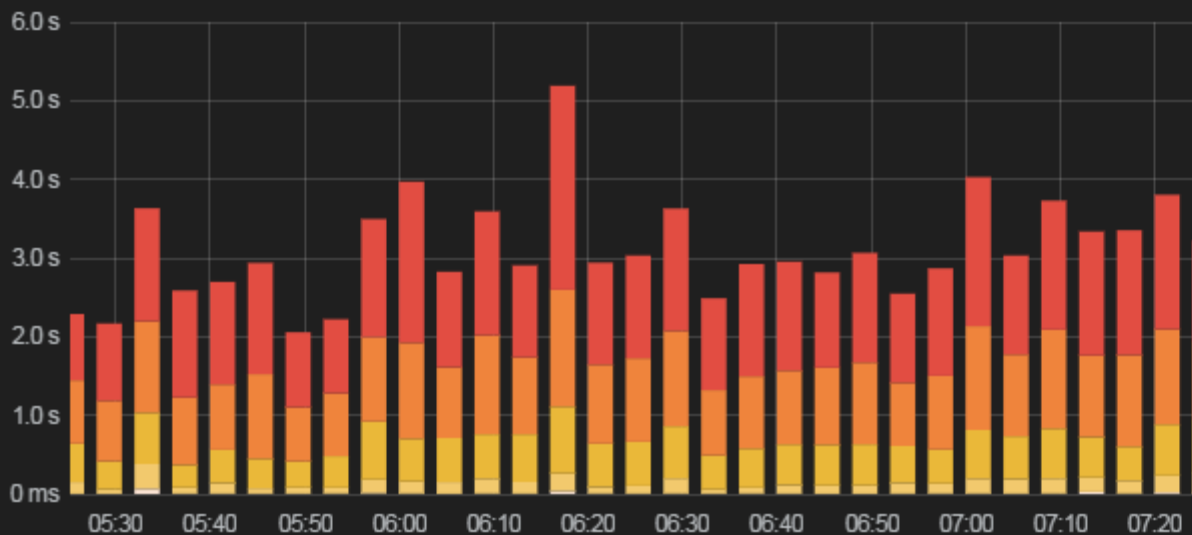
catchpoint®  
keynote  
New Relic®  
SCASTA  
pingdom



# Do It Yourself

```
$(window).on('load', function() {  
  var pageName = $('body').attr('id');  
  var t = window.performance.timing;  
  var diff = t.loadEventStart - t.navigationStart;  
  var url = baseUrl + '?' + pageName + '=' + diff;  
  new Image().src = url;  
});
```

client side full page load



	avg
— upper_25	8 ms
— upper_50	145 ms
— upper_75	530 ms
— upper_90	1.021 s
— upper_95	1.404 s

grafana.org



# Timing Browser APIs

- New browser APIs
  - Navigation timing
  - Resource Timing
  - User Timing
  - measure custom events with  
`performance.mark("task1")`
- `navigationStart`  
is the **real** navigation start



# Synthetic & RUM



**Page metrics &  
Speed Index &  
Custom events**

# AN ENGINEER'S GUIDE TO OPTIMIZATION

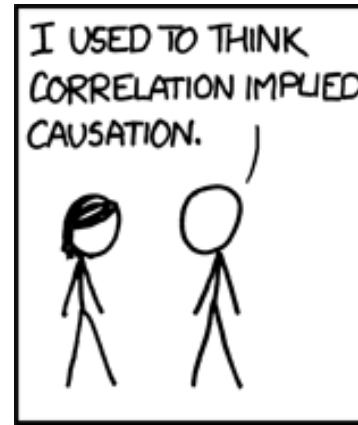
By Tony Gentilcore

- Identify a scenario which optimizing will move the needle of a business metric
- Measure the scenario
- Calculate light speed
- Approach the speed of light

Source: <http://goo.gl/B6ePS2>

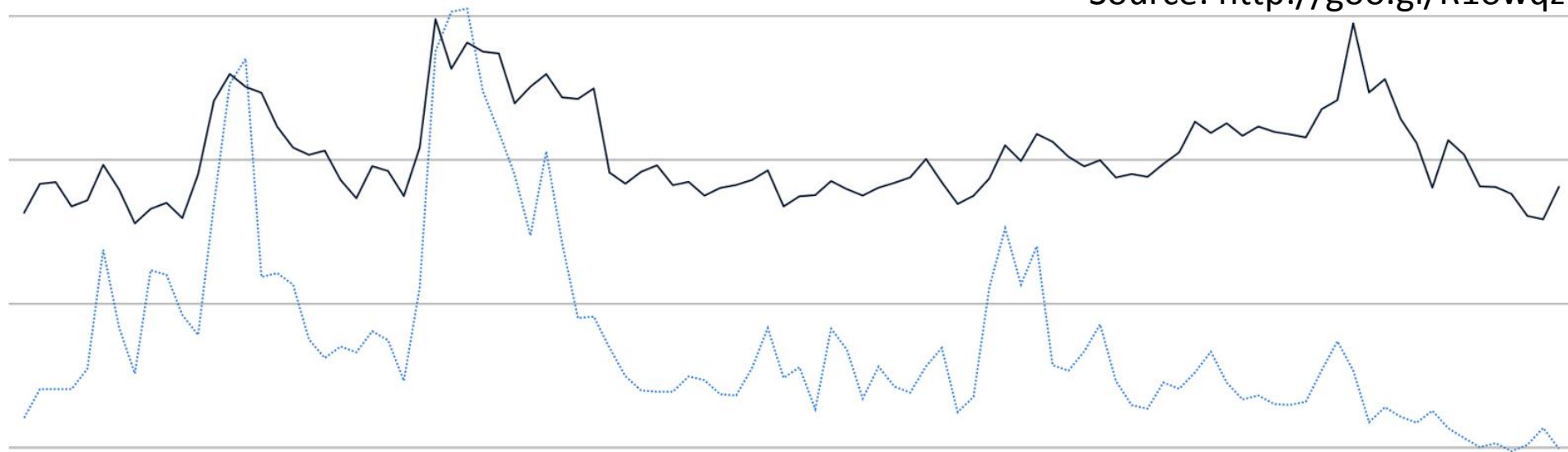
 <http://flic.kr/p/bF1gCw>

# Correlation



xkcd.com/552

Source: <http://goo.gl/R1owqz>



1 second slower can cause 5% bounce rate increase

17. Mar

31. Mar

14. Apr

28. Apr

12. May

26. May

9. Jun



# In the future...



# Analyzing & improving

Riddles?  
now or on  
twitter  
@cowchimp

