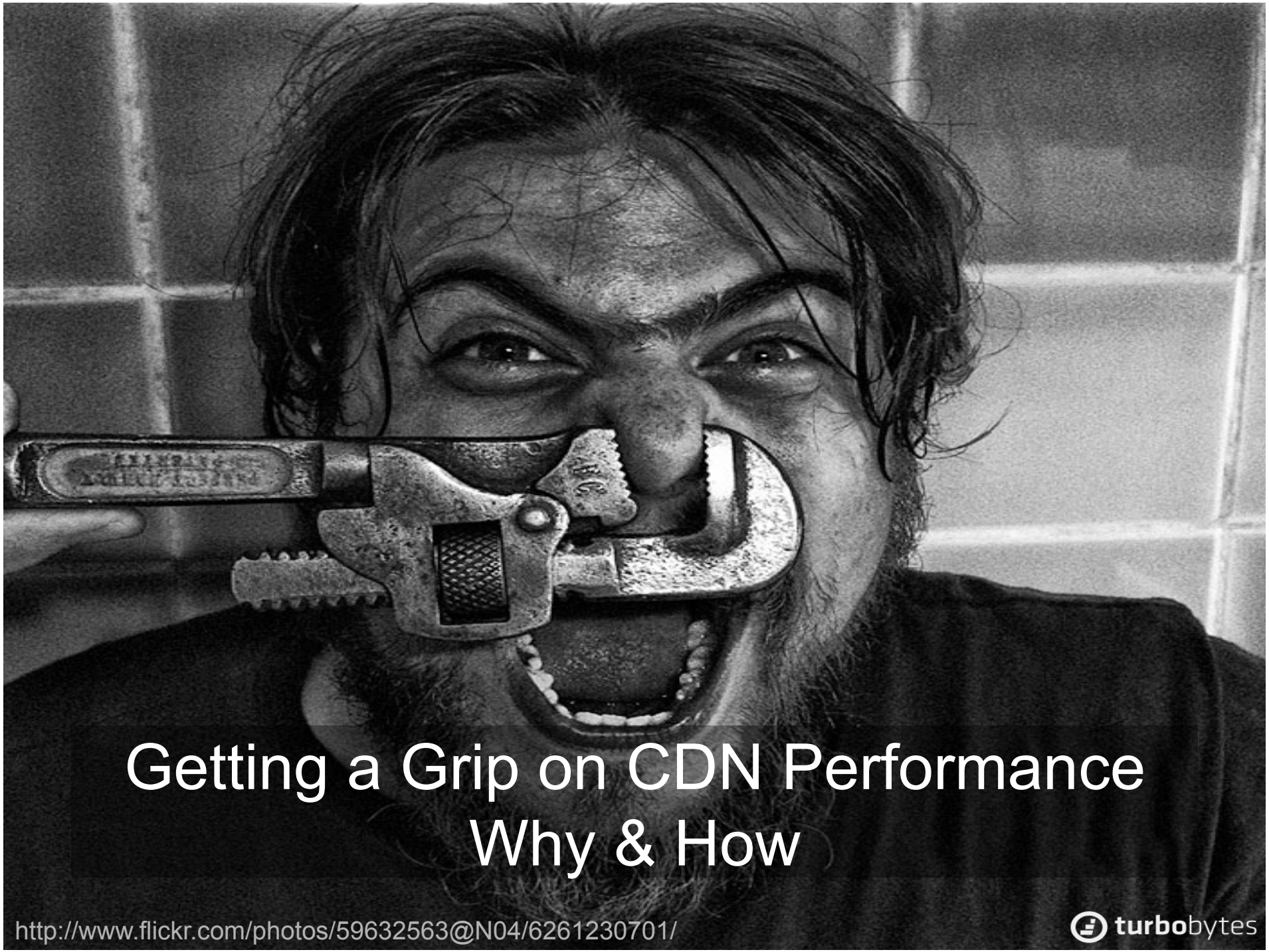
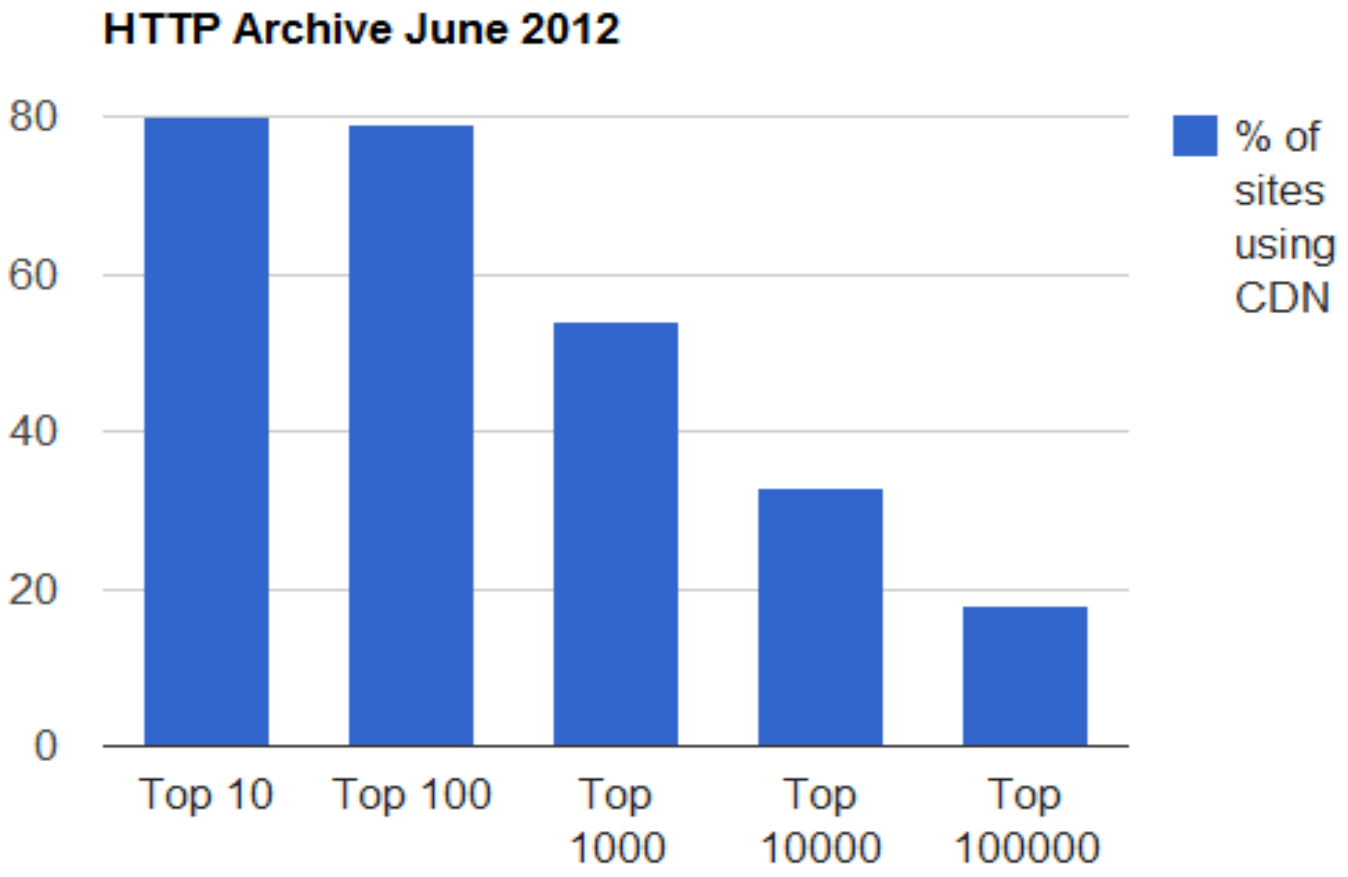

Getting a Grip on CDN Performance
Why & How
http://www.flickr.com/photos/59632563@N04/6261230701/
turbobytes

How many sites use a CDN?



turbobytes


CDN Performance in the Real World
http://www.flickr.com/photos/59632563@N04/6261230701/
turbobytes

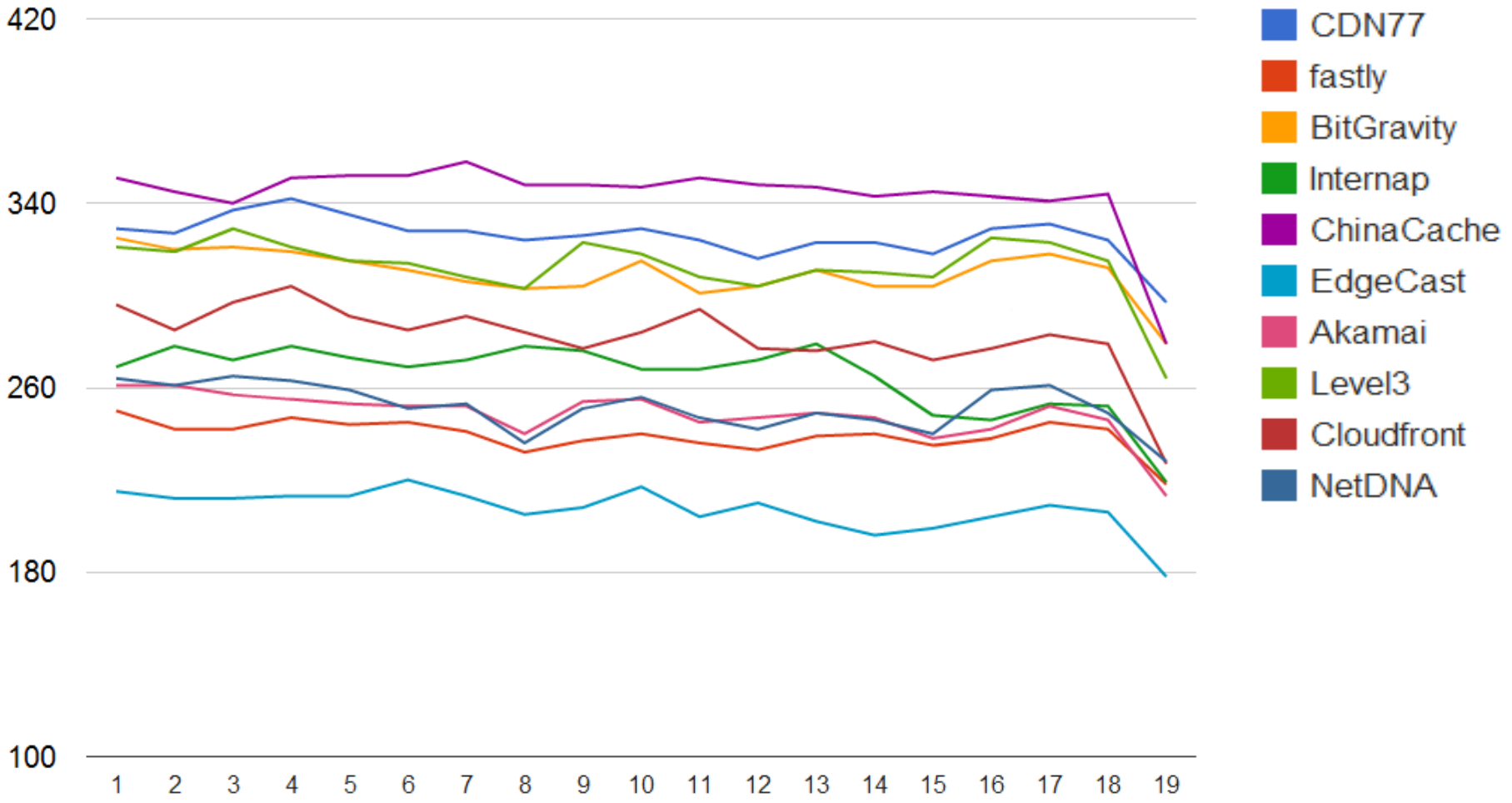
How we measure CDN performance

Real User Monitoring (RUM)

Download a 16 KB static file from a CDN to a browser > send timing data to our server

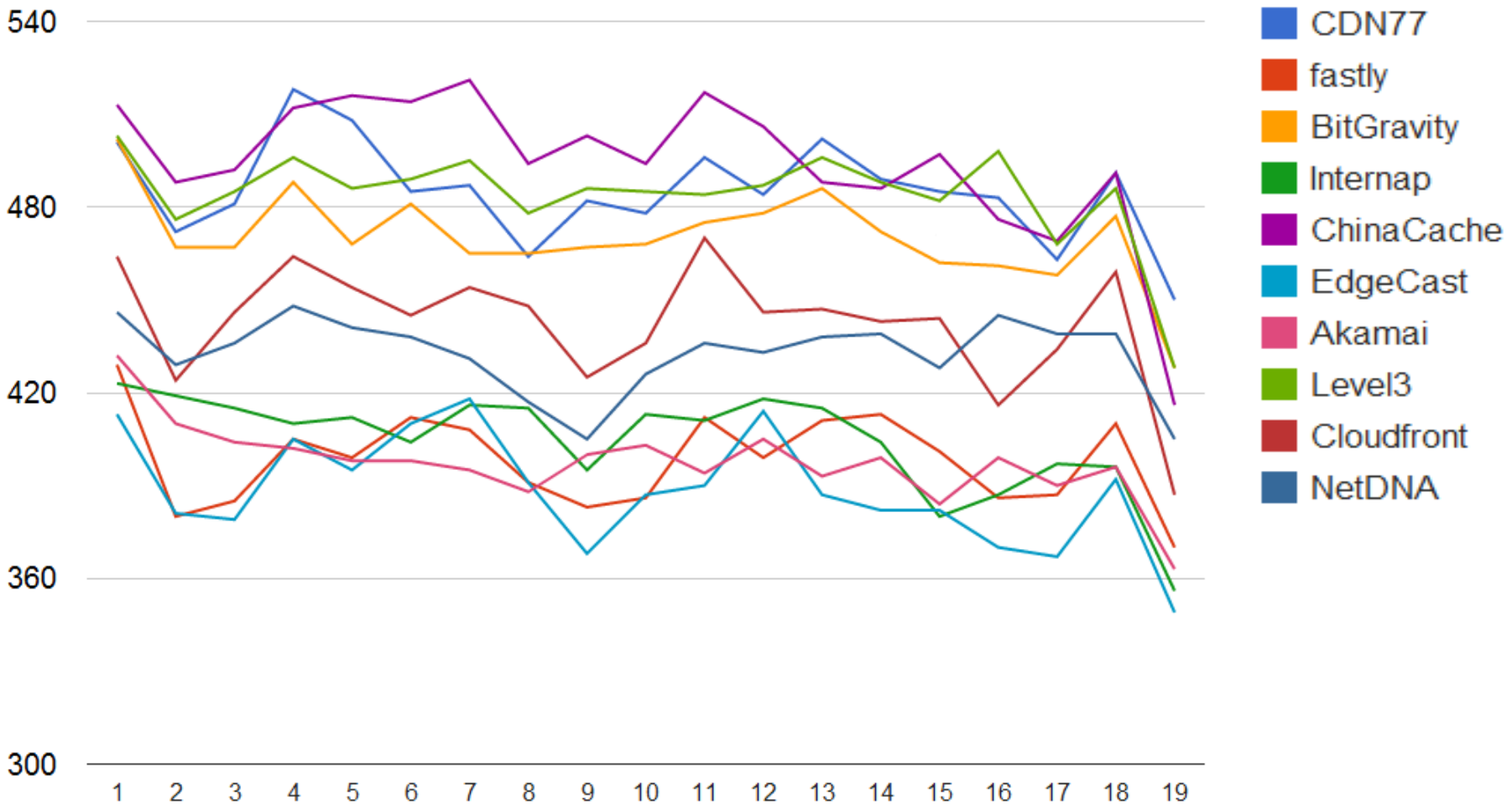
More details later on how we do RUM

Total load time (median) in US



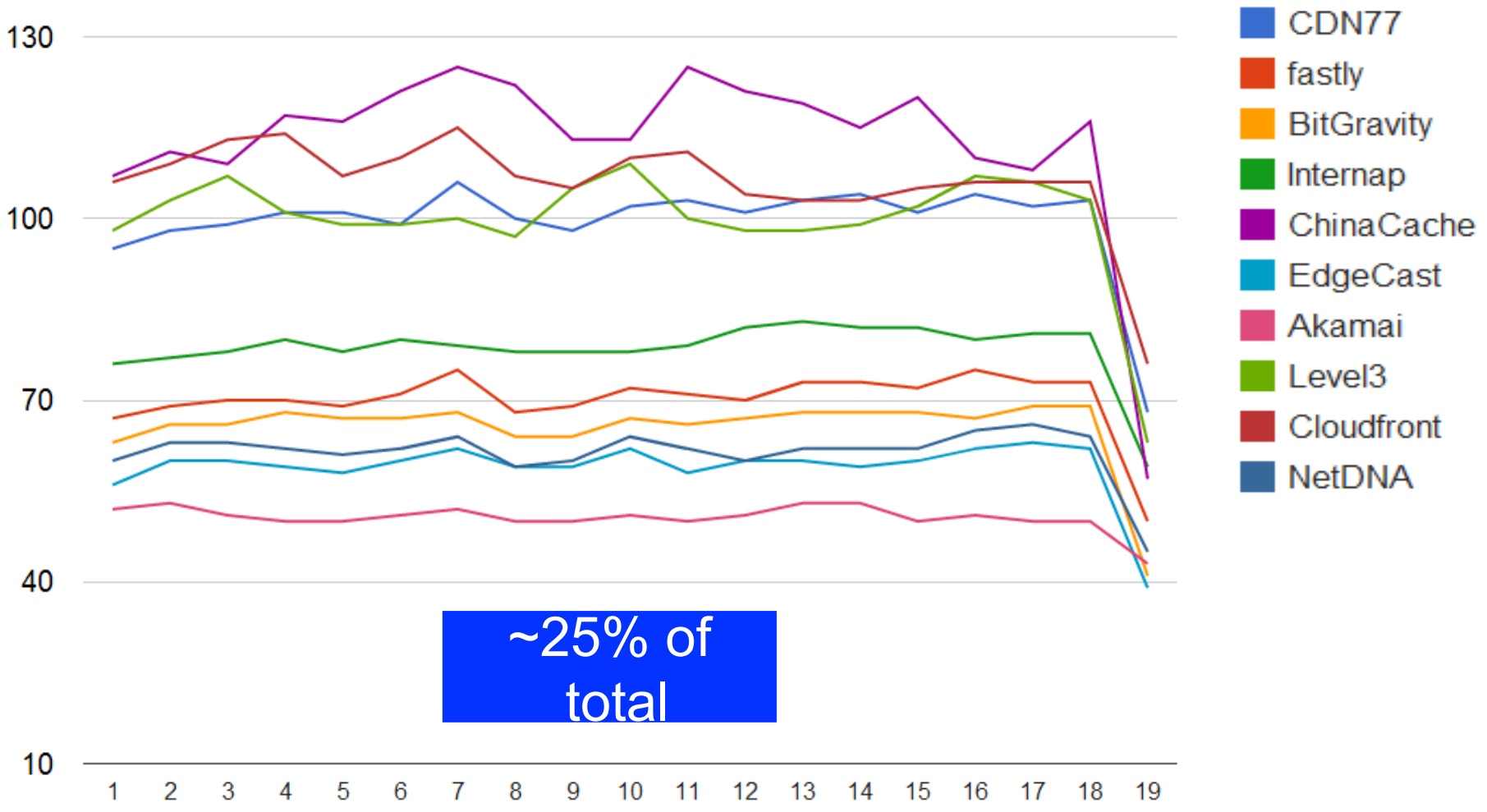
turbobytes

Total load time (mean) in US



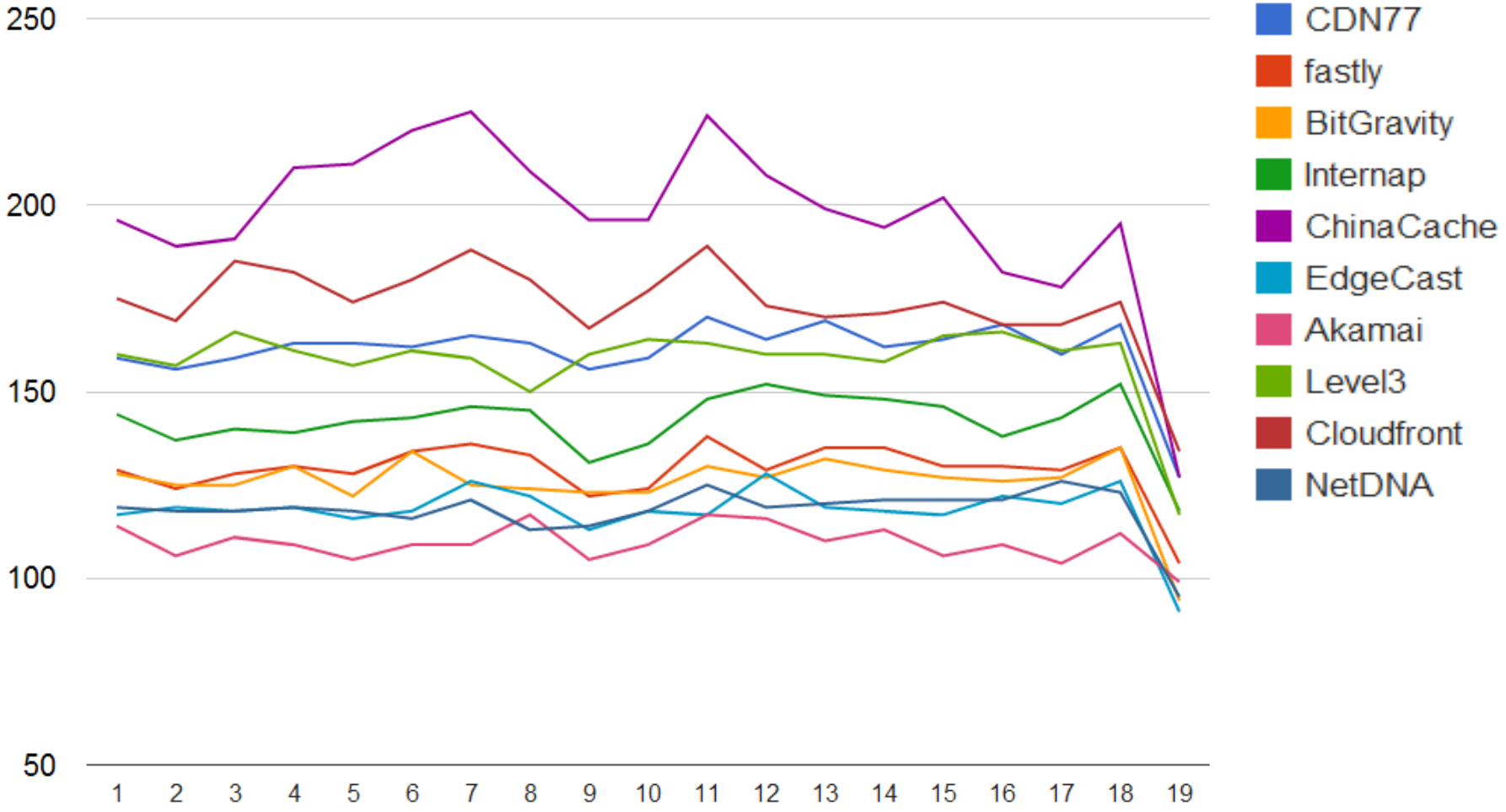
turbobytes

DNS time (median) in US



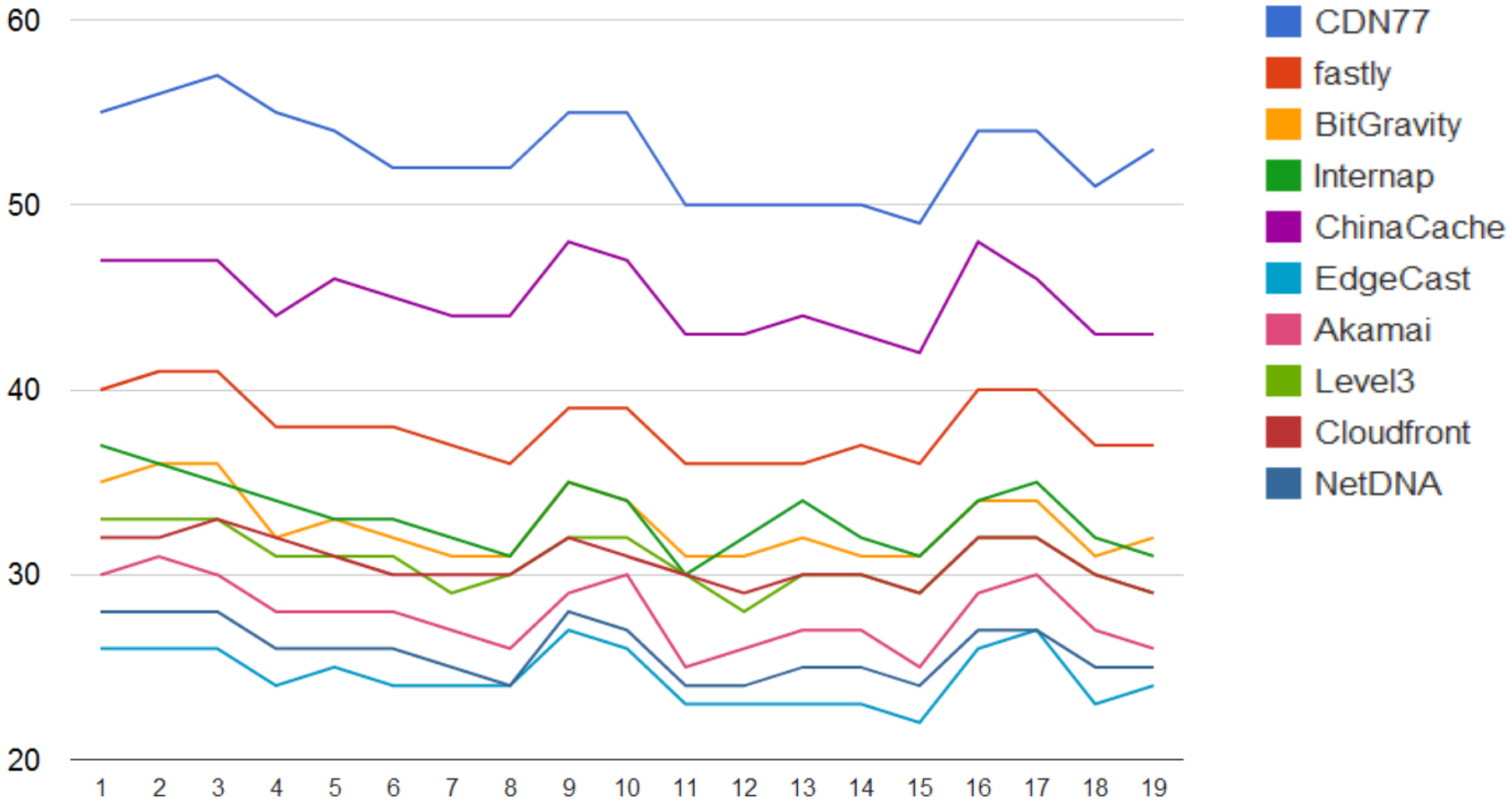
turbobytes

DNS time (mean) in US



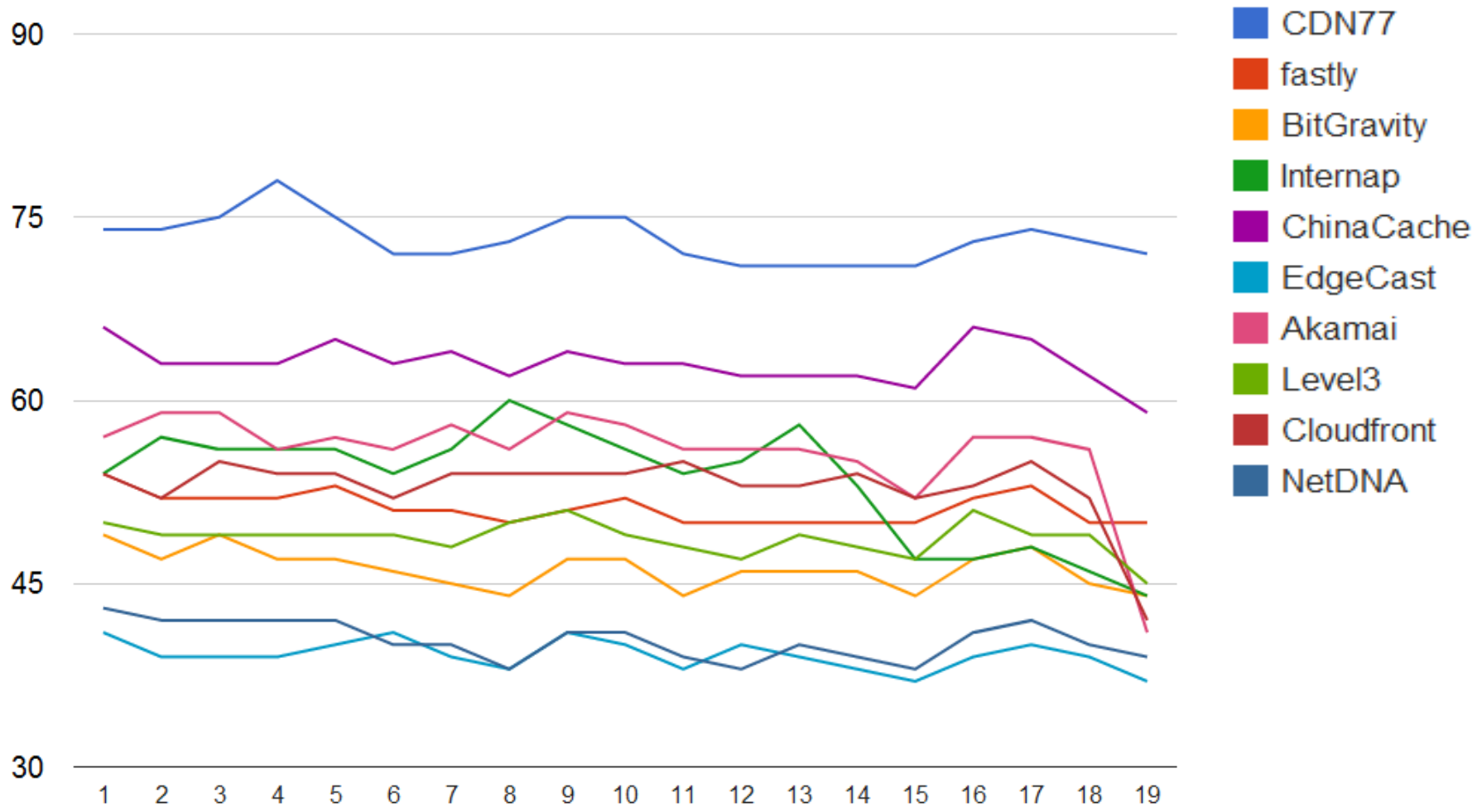
turbobytes

Connect time (median) in US



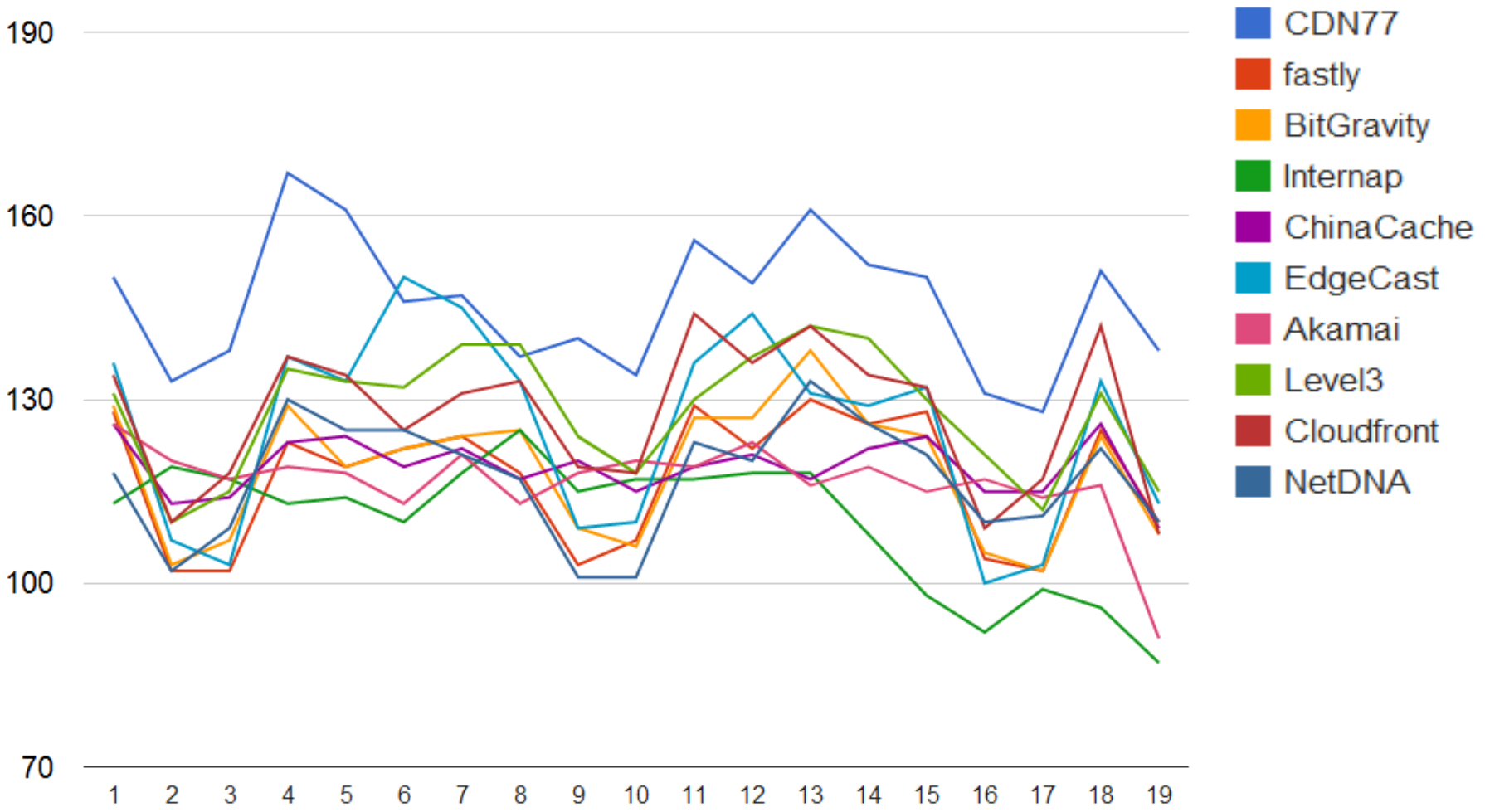
turbobytes

First byte time (median) in US



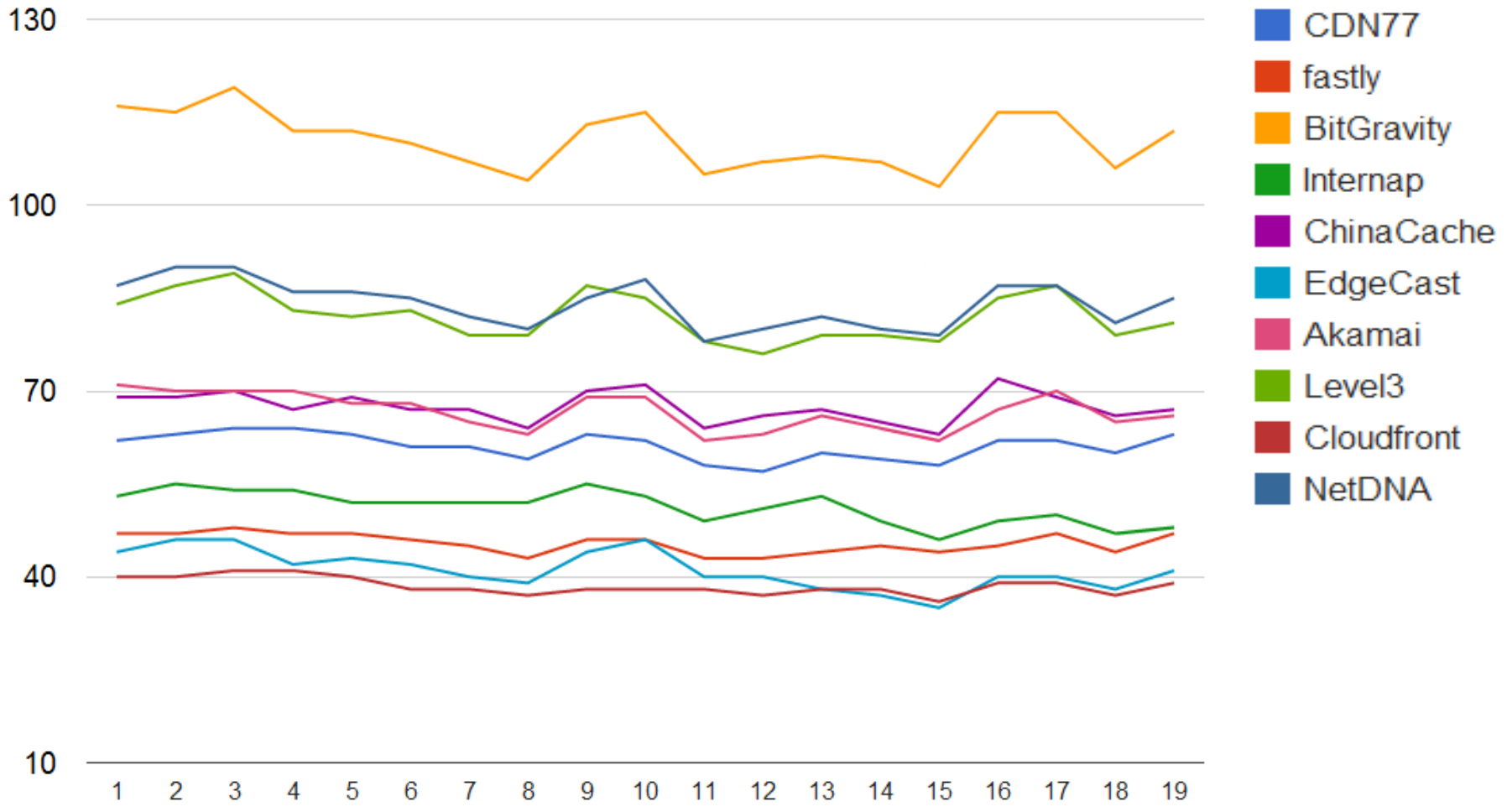
turbobytes

First byte time (mean) in US



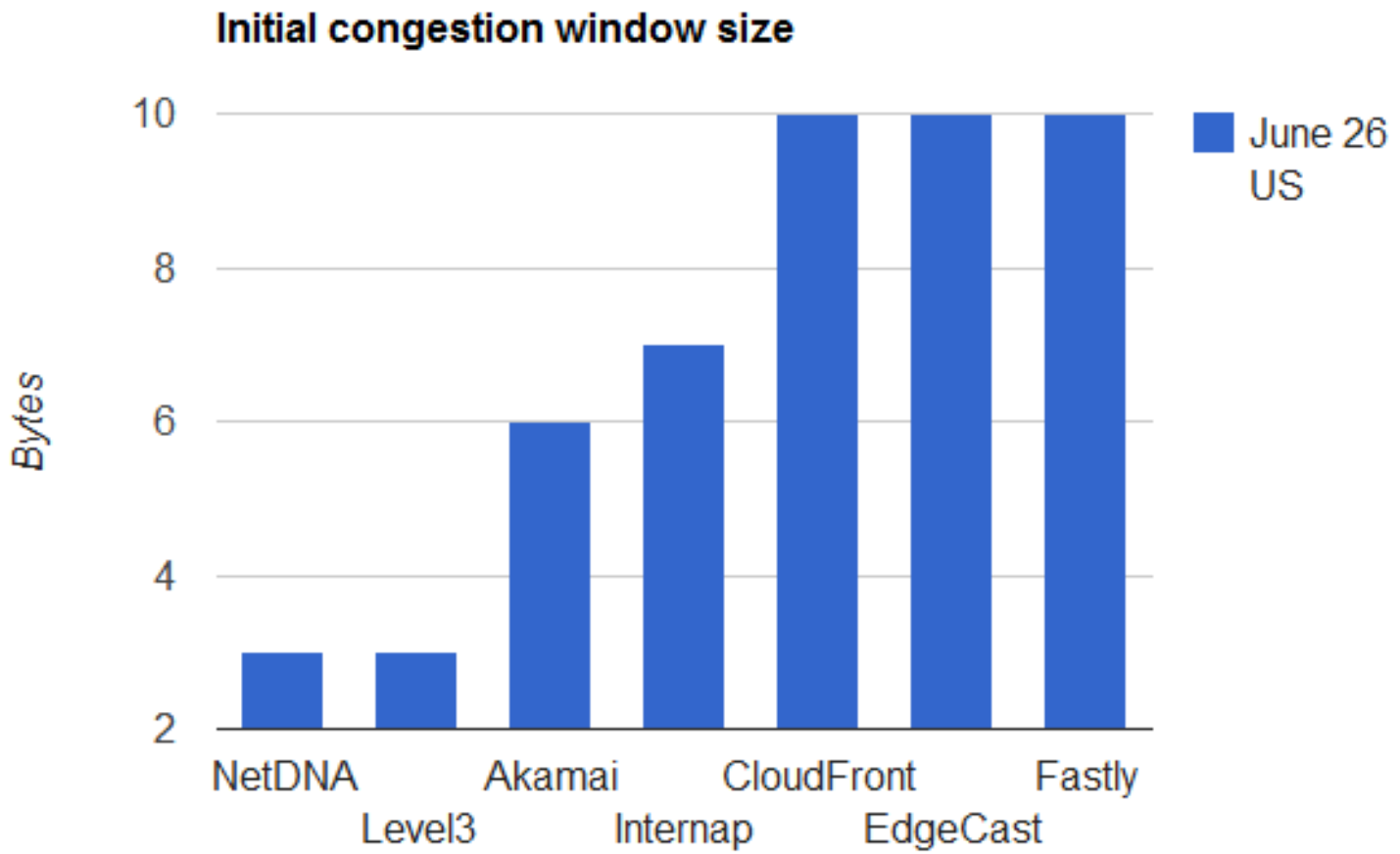
turbobytes

Transfer time (median) in US



turbobytes

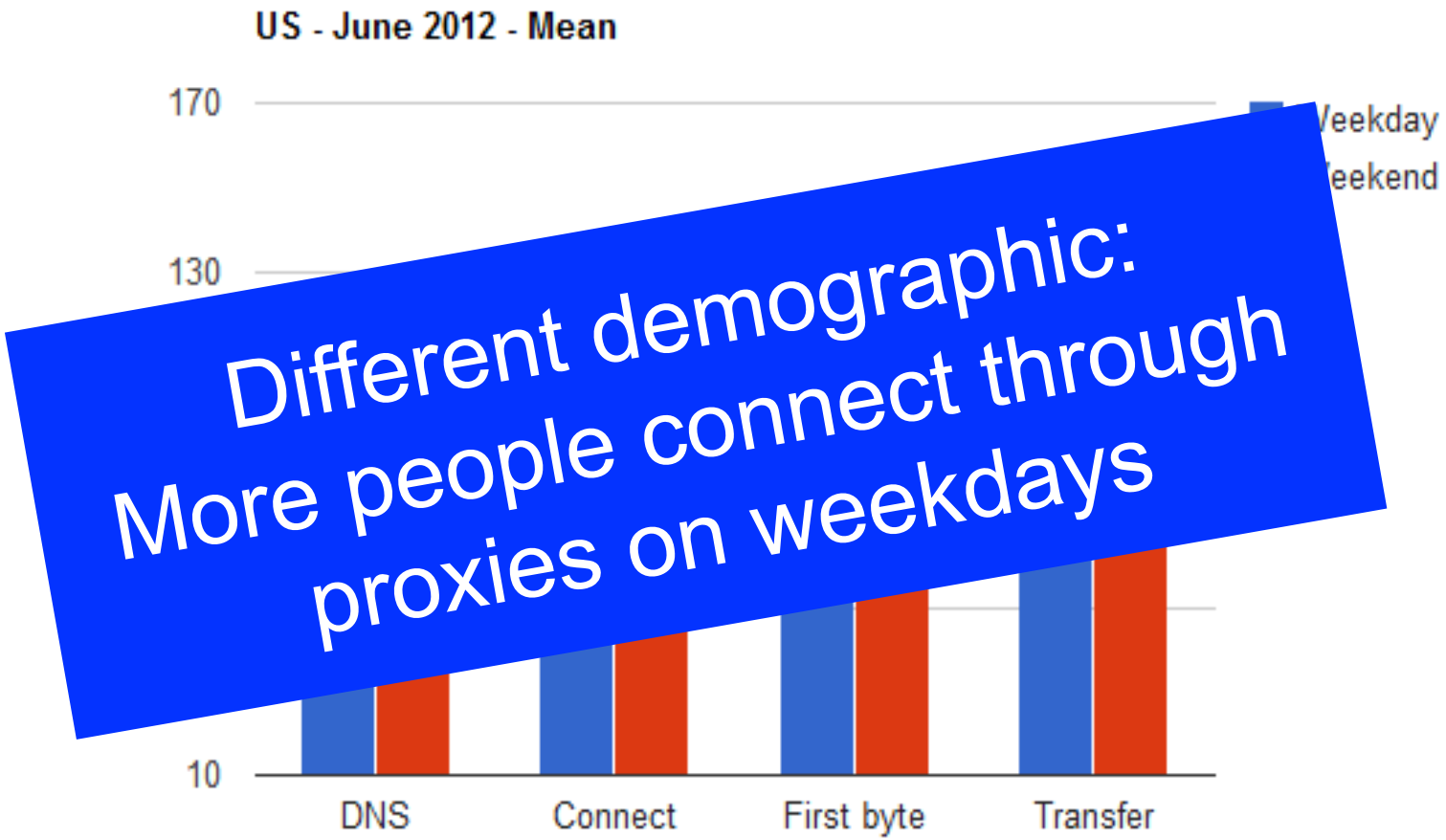
initcwnd of CDNs



http://www.cdnplanet.com/blog/initcwnd-settings-major-cdn-providers/

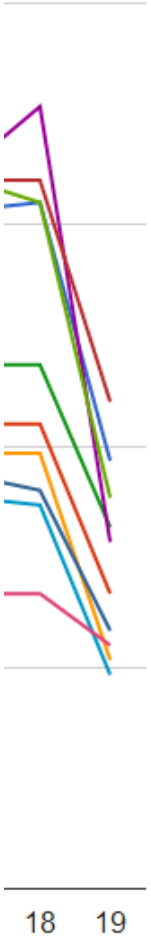
turbobytes

Weekdays vs Weekends (mean)



turbobytes

What happened on June 19?



DNS time

Improvement for all CDNs

Better caching at ISPs

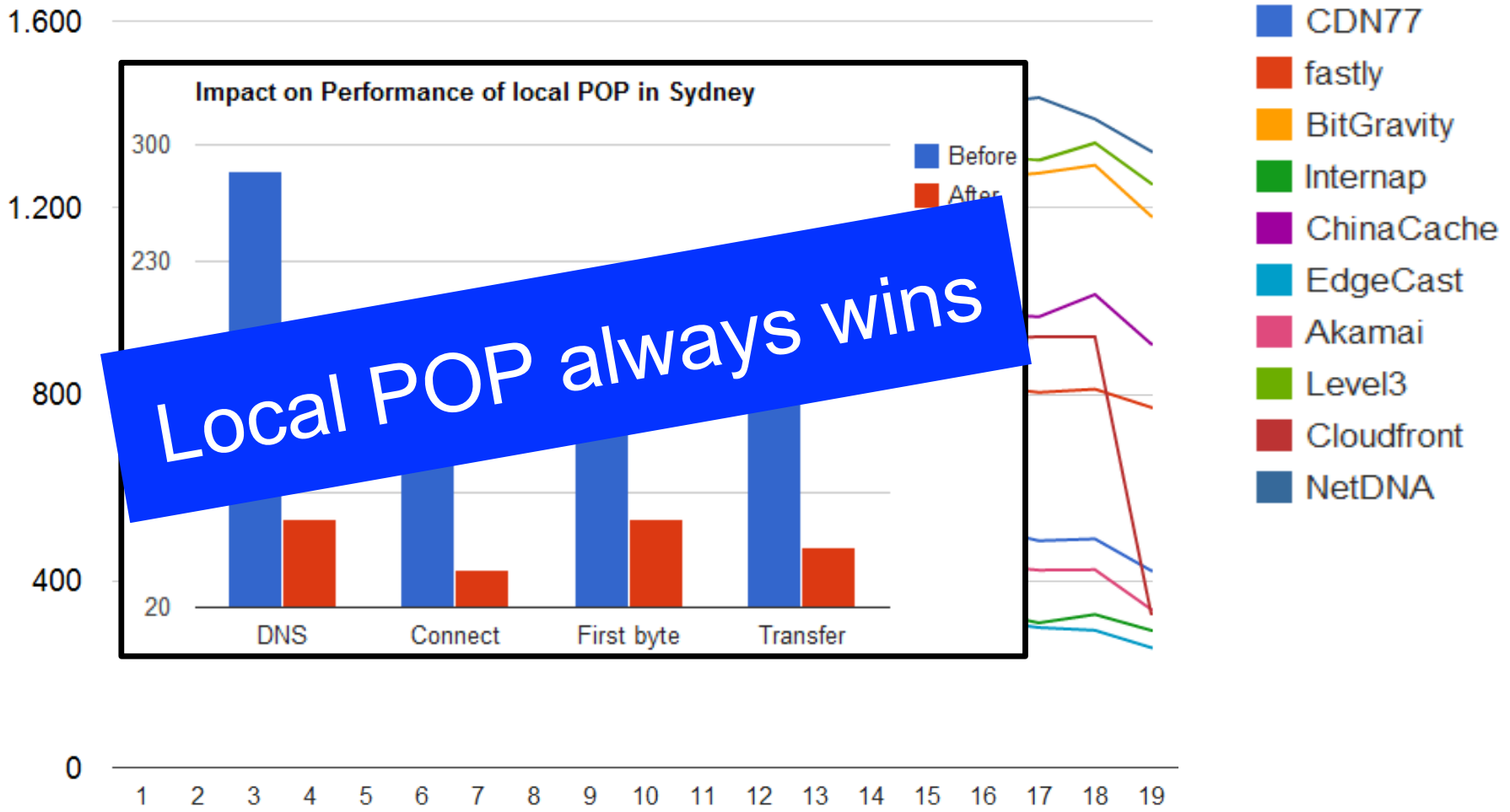
First byte time

Improvement for only 2 CDNs

Object is more popular > gets served from memory now, or ...

turbobytes

Australia: different playing field



turbobytes

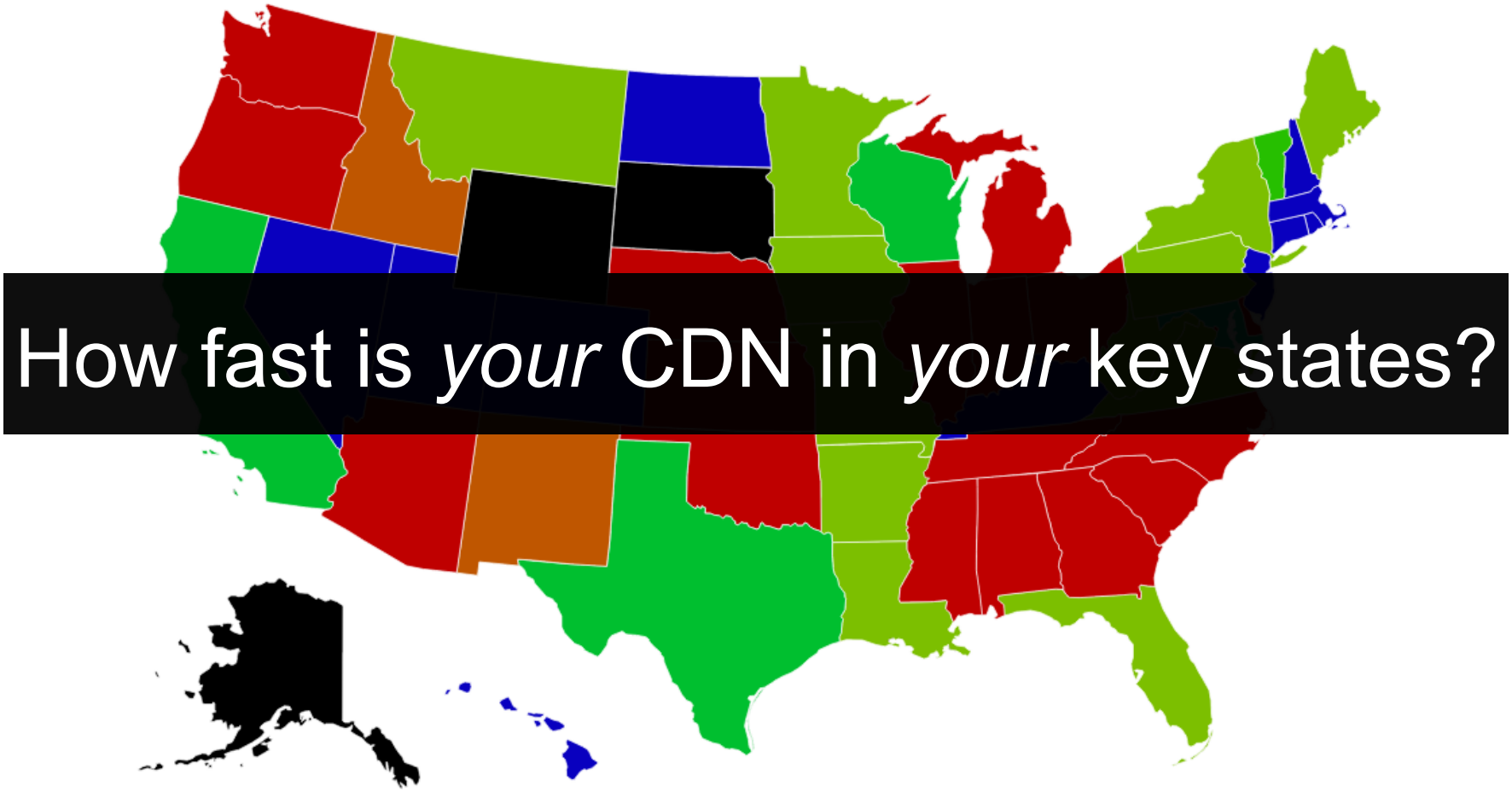
Global performance

Is *your* CDN fast in *your* key countries?

http://c.turbobytes.com/static/uploads/velocity12/world-static.html
http://c.turbobytes.com/static/uploads/velocity12/world-anim.html

turbobytes

Performance varies between states

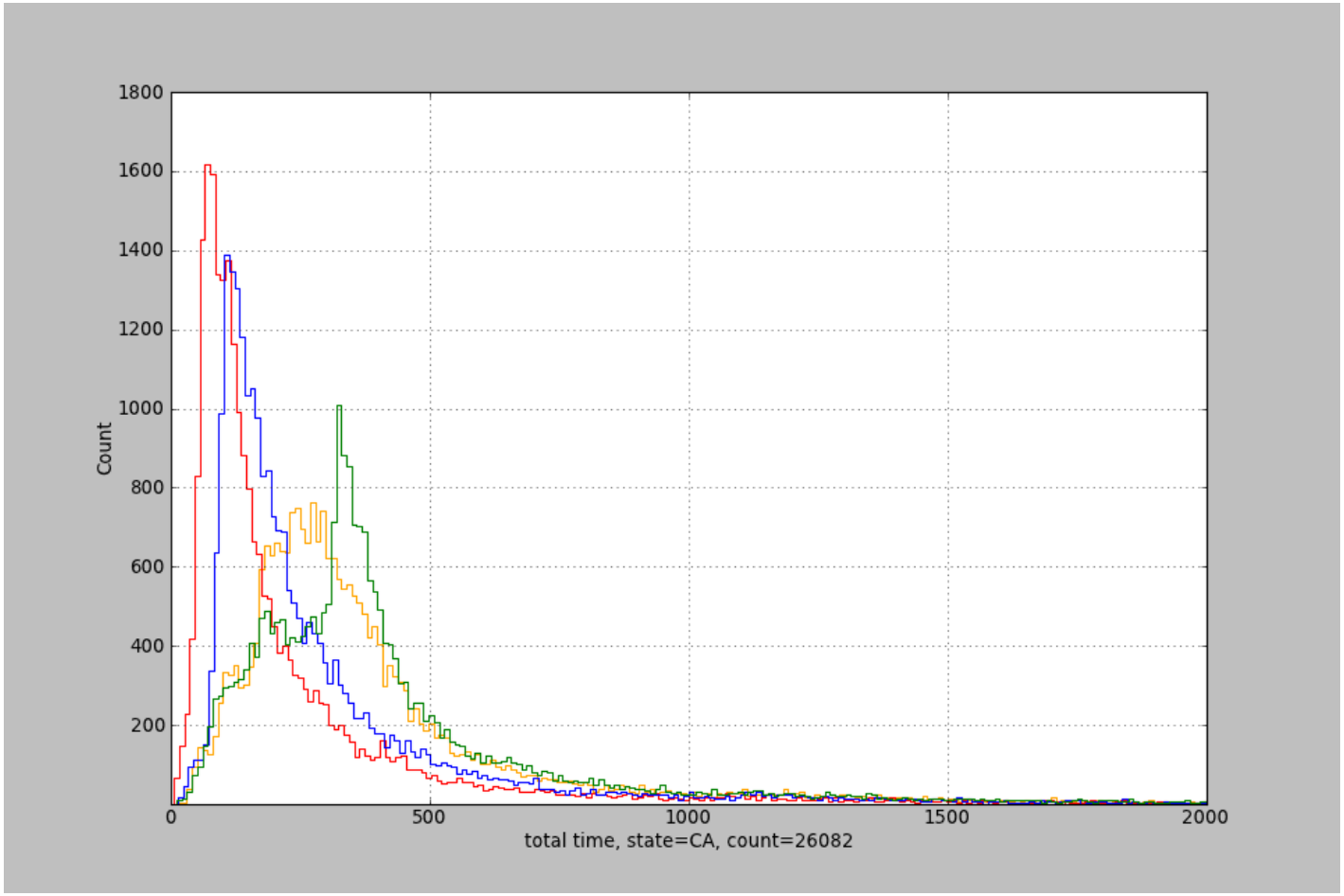


How fast is *your* CDN in *your* key states?

http://c.turbobytes.com/static/uploads/velocity12/us-state-static.html
http://c.turbobytes.com/static/uploads/velocity12/us-state-anim.html

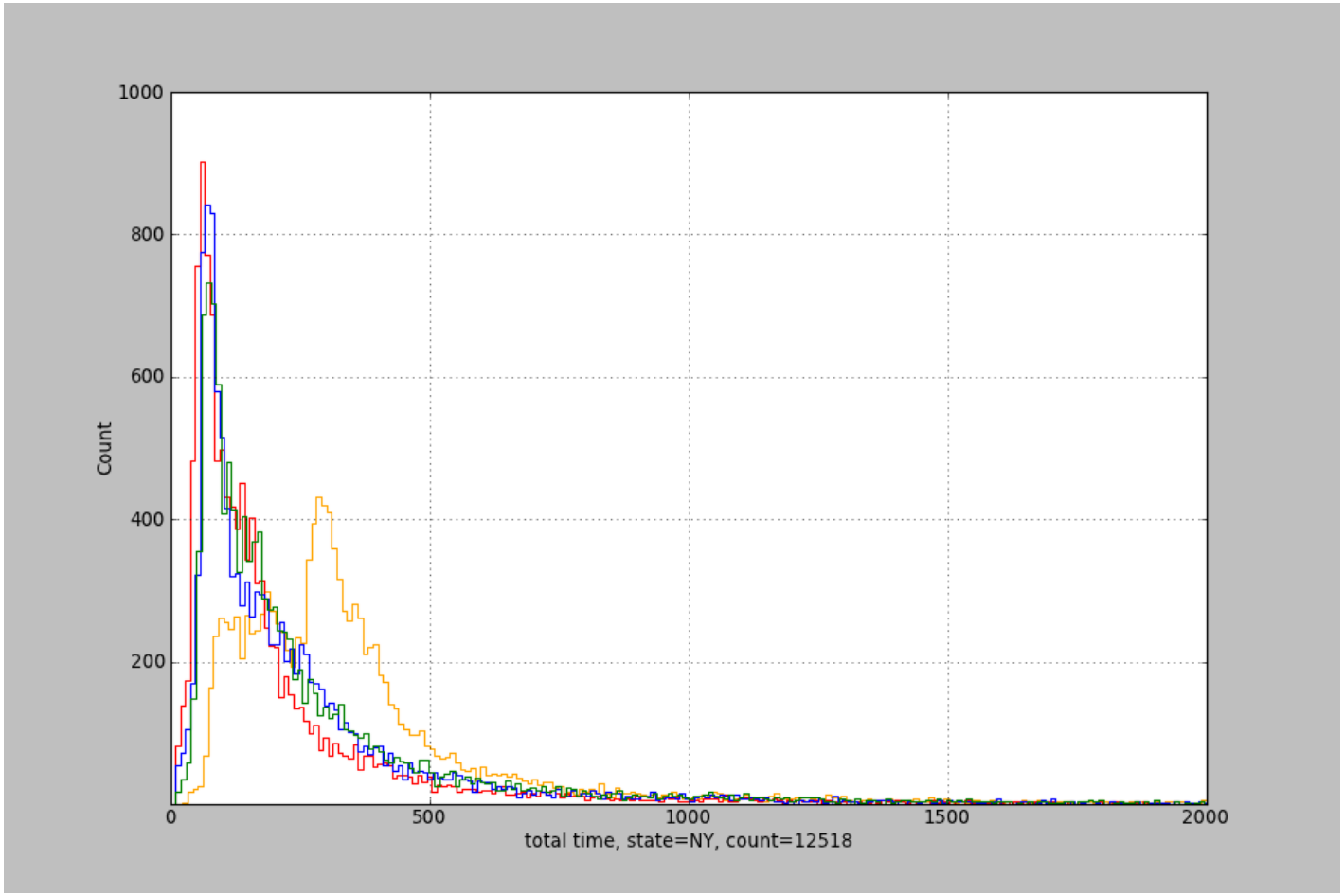
turbobytes

Green: not so good in California



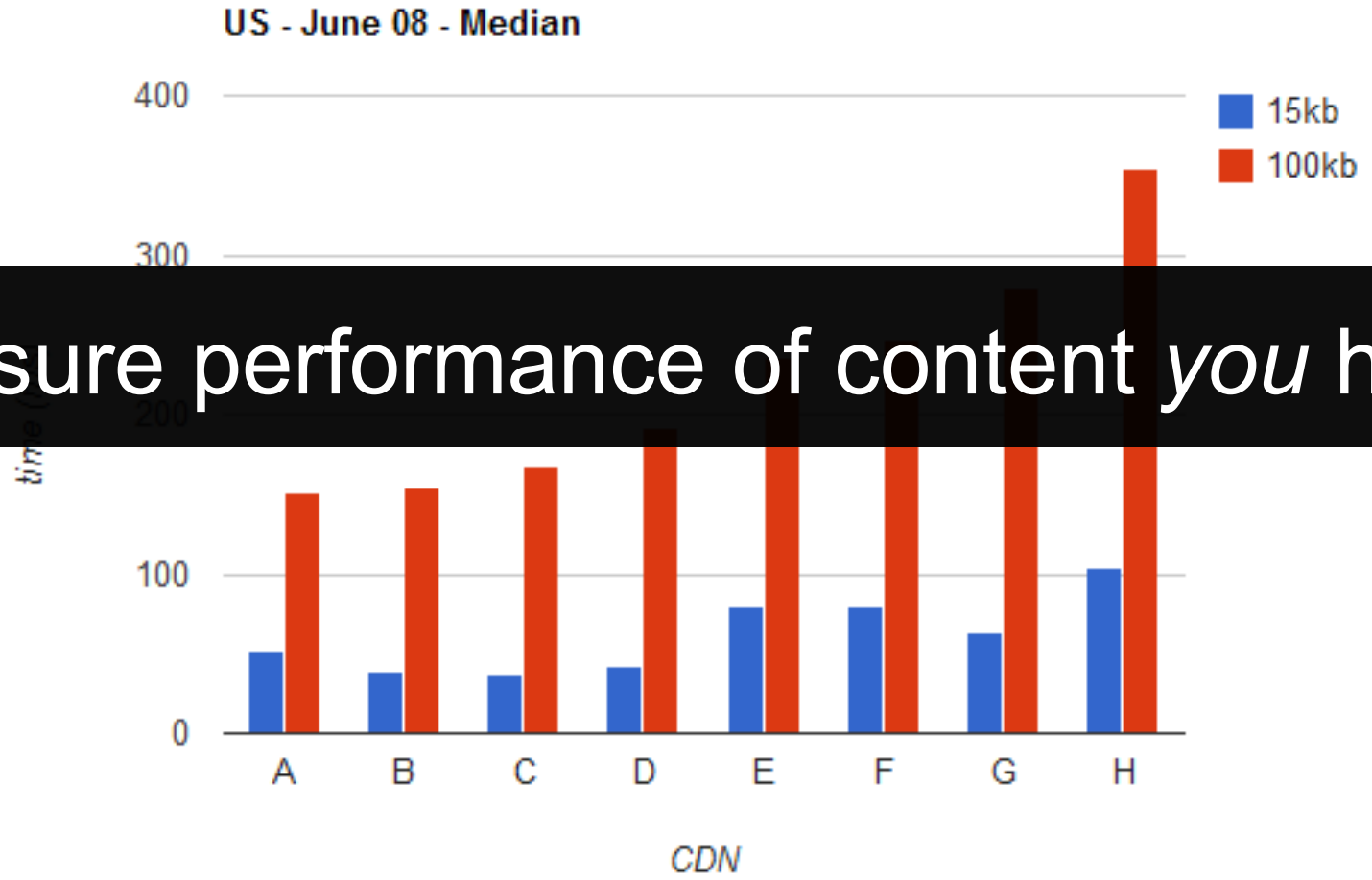
turbobytes

Much better in New York



turbobytes

15 kb versus 100 kb file



Measure performance of content *you* have

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Monitoring CDN Performance

http://www.flickr.com/photos/59632563@N04/6261230701/

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Access log files of origin

No data on how fast the CDN is (duh)

Two reasons to analyze 'em:

1. Cache MISS rate

2. Spot patterns in requests from the CDN

Access log files of CDN

Again, no data on how fast the CDN is

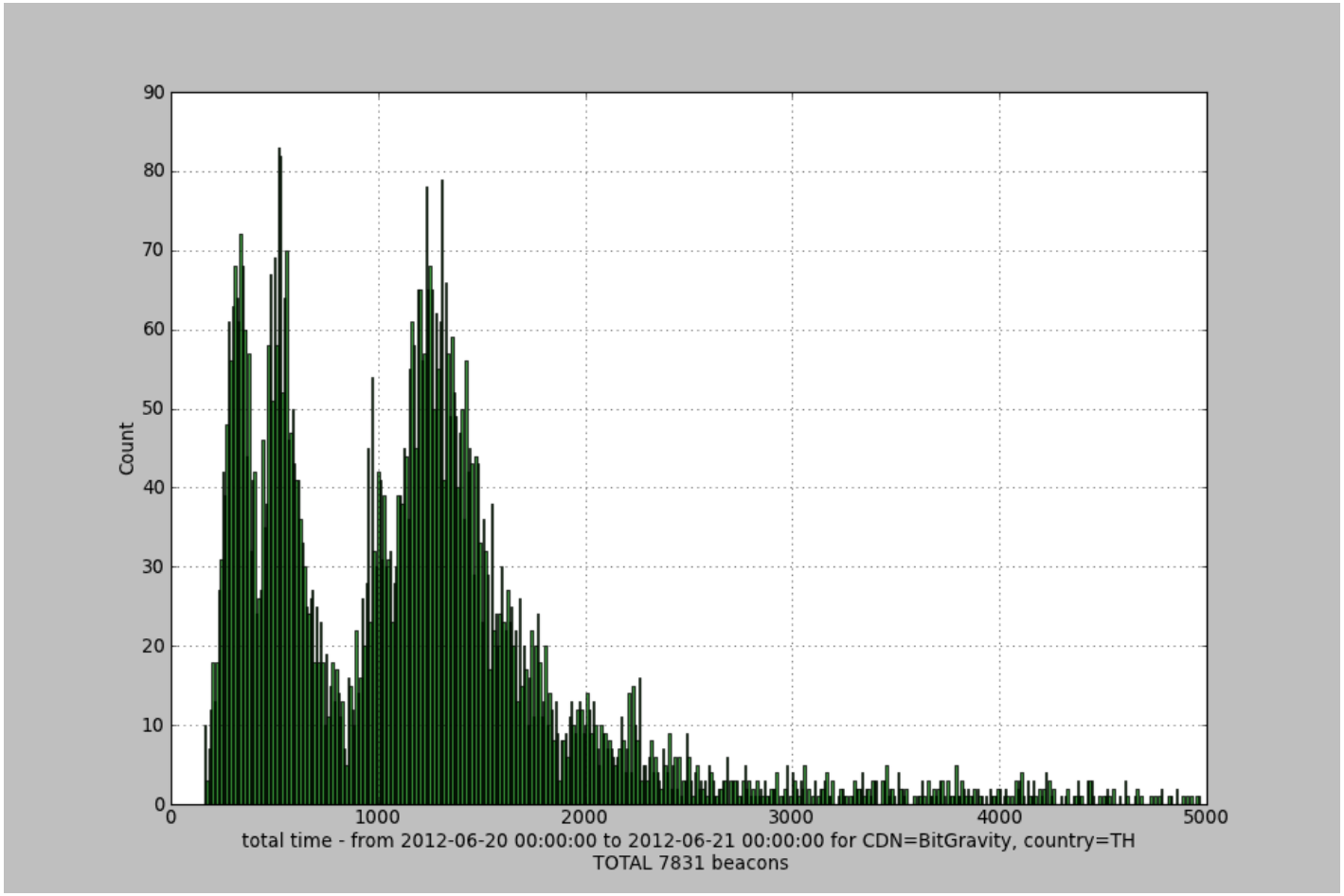
Three reasons to analyze 'em:

1. Cache MISS rate

2. Spot patterns in requests from the CDN

3. Spot HITs from far-away POPs

Hits from far-away POPs



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'Backbone' synthetic monitoring

Datacenter-to-datacenter != the real world

Tells you nothing about real user experience

Don't use it

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Real browser synthetic monitoring

Catchpoint, Gomez, WebPagetest etc.

Real browser, but

– Still in a datacenter

– Not your real users

Close, but no cigar

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With-CDN versus Without-CDN

How much faster do your *pages* load?

WebPagetest:

```
SetDNSName        cdn.domain.com
     www.domain.com
overrideHost cdn.domain.com
     www.domain.com
navigate          www.domain.com
```

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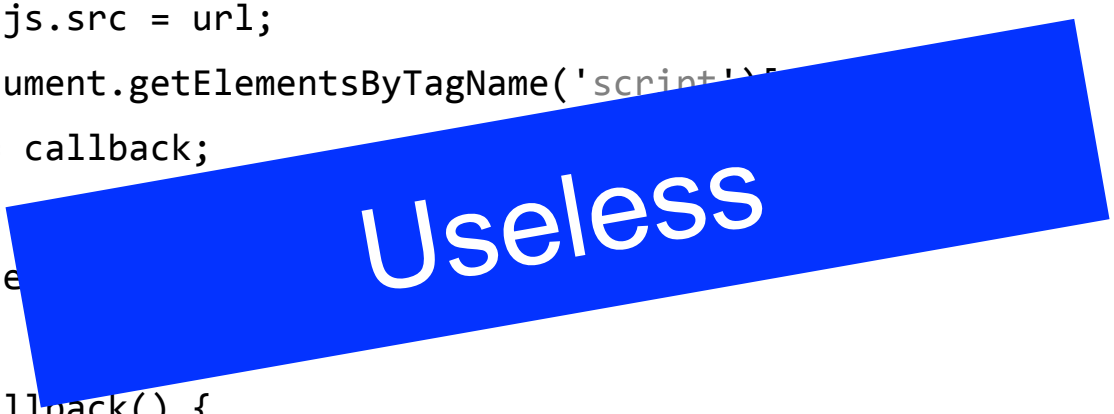
Google Analytics User Timings

```
var startTime;
function loadJs(url, callback) {
  var js = document.createElement('script');
  js.async = js.src = url;
  var s = document.getElementsByTagName('script')
  js.onload = callback;
  startTime =
  s.parentNode
}
function myCallback() {
  var endTime = new Date().getTime();
  _gaq.push(['_trackTiming', 'jQuery', 'Load Library', new Date().getTime() -
   startTime, 'Google CDN', 50]);
};
loadJs('//hostname/path/to/jquery.min.js', myCallback);
```



https://developers.google.com/analytics/devguides/collection/gajs/gaTrackingTiming

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Resource Timing API

'Navigation Timing for page resources'

Cross-origin resources must be sent with `Timing-Allow-Origin:example.com` header for API to expose load time details (DNS, etc.)

Easy: send header from origin, so CDN sends it too

Future!

http://dvcs.w3.org/hg/webperf/raw-file/tip/specs/ResourceTiming/Overview.html

How we do RUM

http://www.flickr.com/photos/like_the_grand_canyon/4580931101/

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Starting points

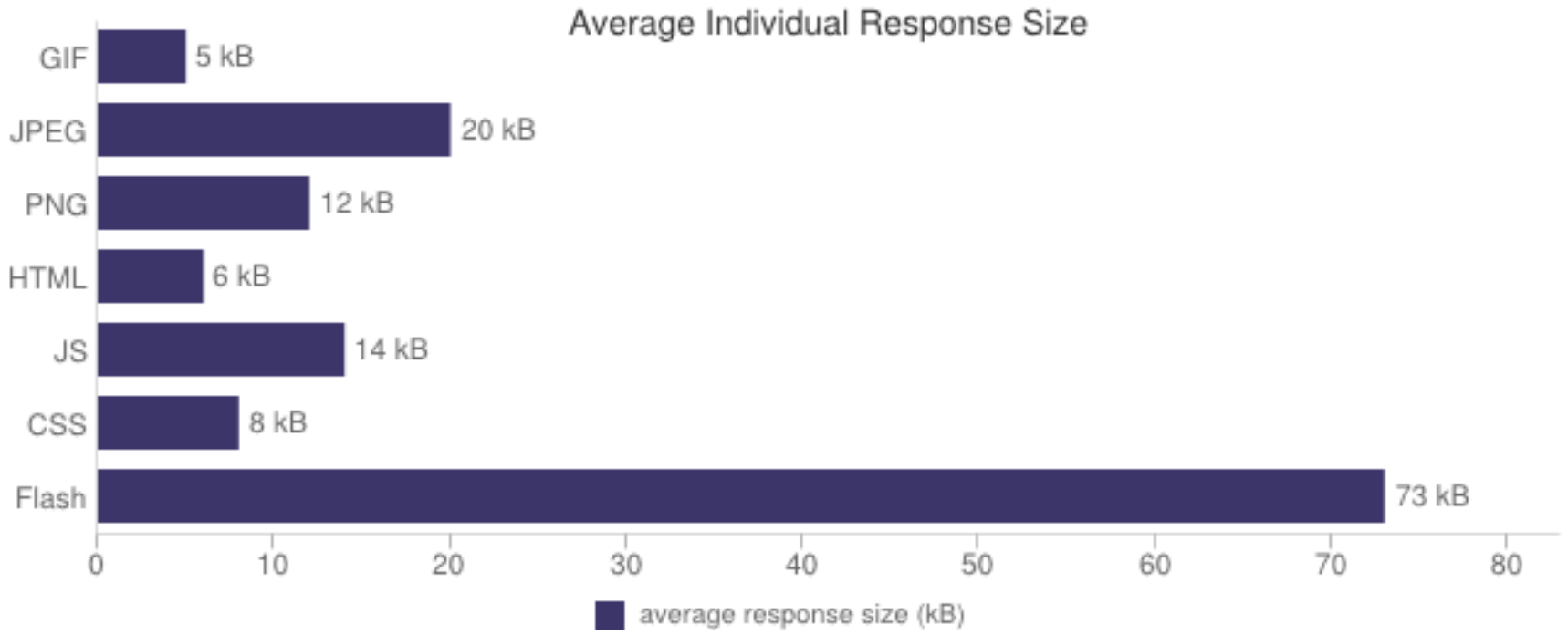
Measure small object delivery over HTTP

We want the details, not just total load time

Few beacons from many users, not many beacons from few users

No impact on UX

Why use a 16 KB file?



turbobytes

What we actually do

Navigation Timing API

loadTime = responseEnd – domainLookupStart

2 lines JS on main page; exec after

Load rum.js async (not in IE6-8)

Check localStorage which CDNs may be used

Load 16 kb HTML file from CDN, in invisible

postMessage timing data from iframe to parent

Don't wait longer than 5 seconds

Update localStorage & beacon to server

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Not all data is good data

NT API implementation is poor in some browsers

Ignore FF<9 & Chrome Frame

We see odd data in Chrome and IE9 too

Server side checks include:

- Is DNS time >0?
- Is Connect time > 0?
- Is TTFB >0?

Tips for improving CDN performance

http://www.flickr.com/photos/ol1/5539623423/

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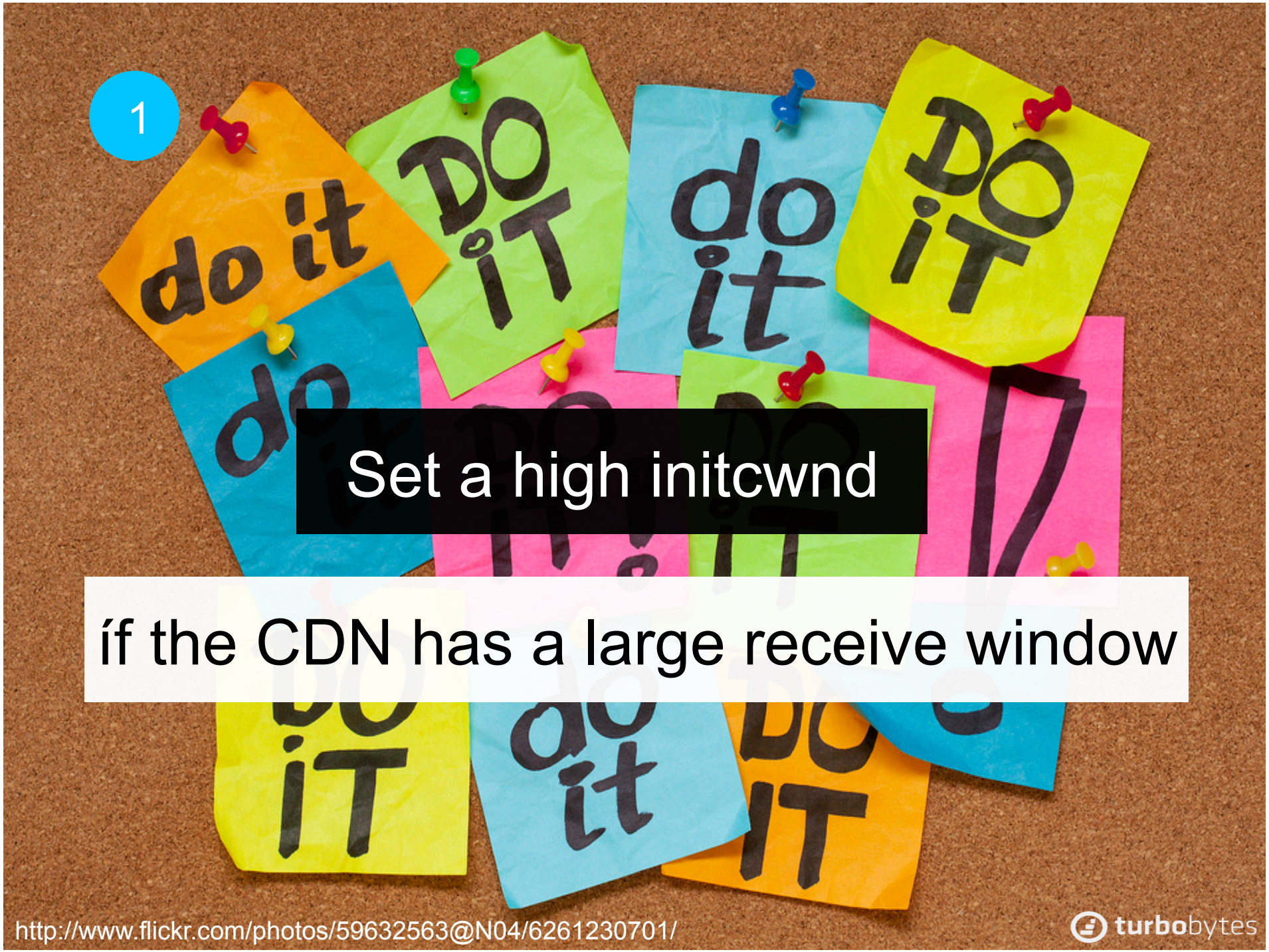
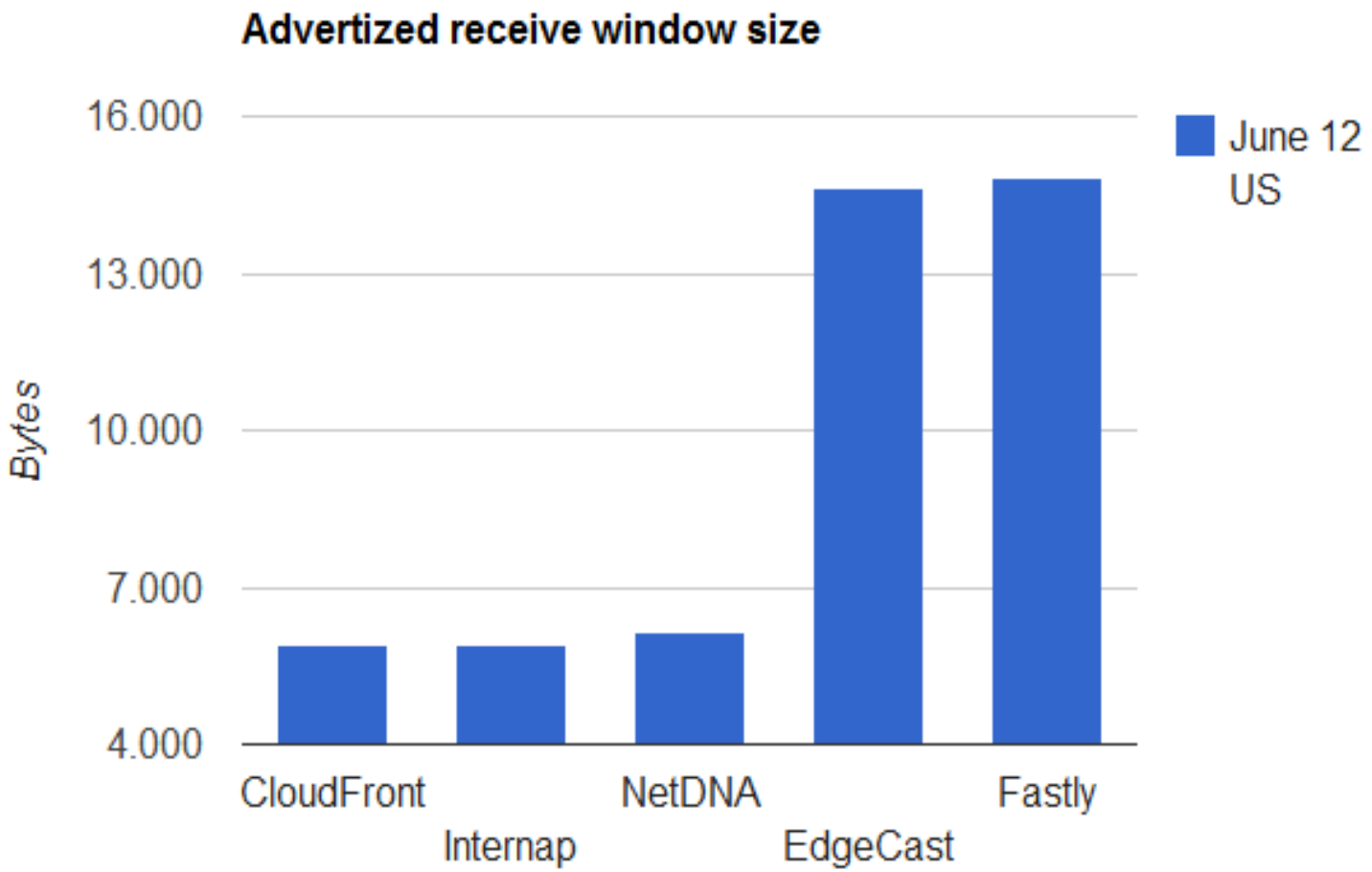

1
Set a high initcwnd
if the CDN has a large receive window
http://www.flickr.com/photos/59632563@N04/6261230701/
turbobytes

initrwnd of CDNs



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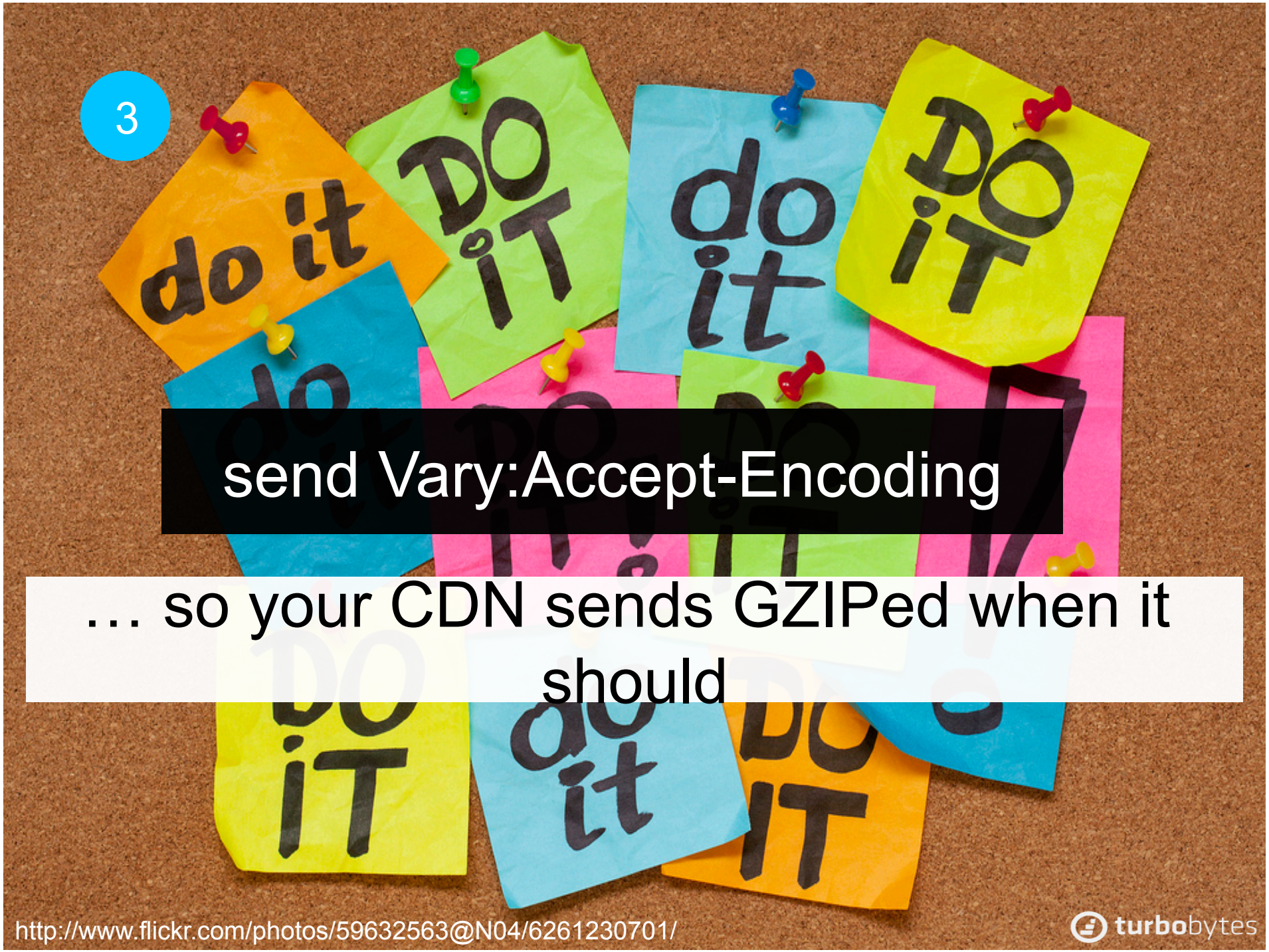
2
Keep connection to CDN open loooong
only íf the CDN wants to keep it open long
http://www.flickr.com/photos/59632563@N04/6261230701/
turbobytes


3
send Vary:Accept-Encoding
… so your CDN sends GZIPed when it should
http://www.flickr.com/photos/59632563@N04/6261230701/
turbobytes


4
WRONG
WAY
don't send Vary:User-Agent
… to prevent a high cache MISS rate
http://www.flickr.com/photos/begnaud/243996426/
turbobytes


5
add jitter to low TTL cache-control
for better UX and origin protection
http://www.flickr.com/photos/59632563@N04/6261230701/
turbobytes


6
set high TTL for DNS
especially important if traffic is low/med
http://www.flickr.com/photos/59632563@N04/6261230701/
turbobytes

http://www.flickr.com/photos/27282406@N03/4134166721/

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www.turbobytes.com