UBER

Fraud in Mobile

April 2018

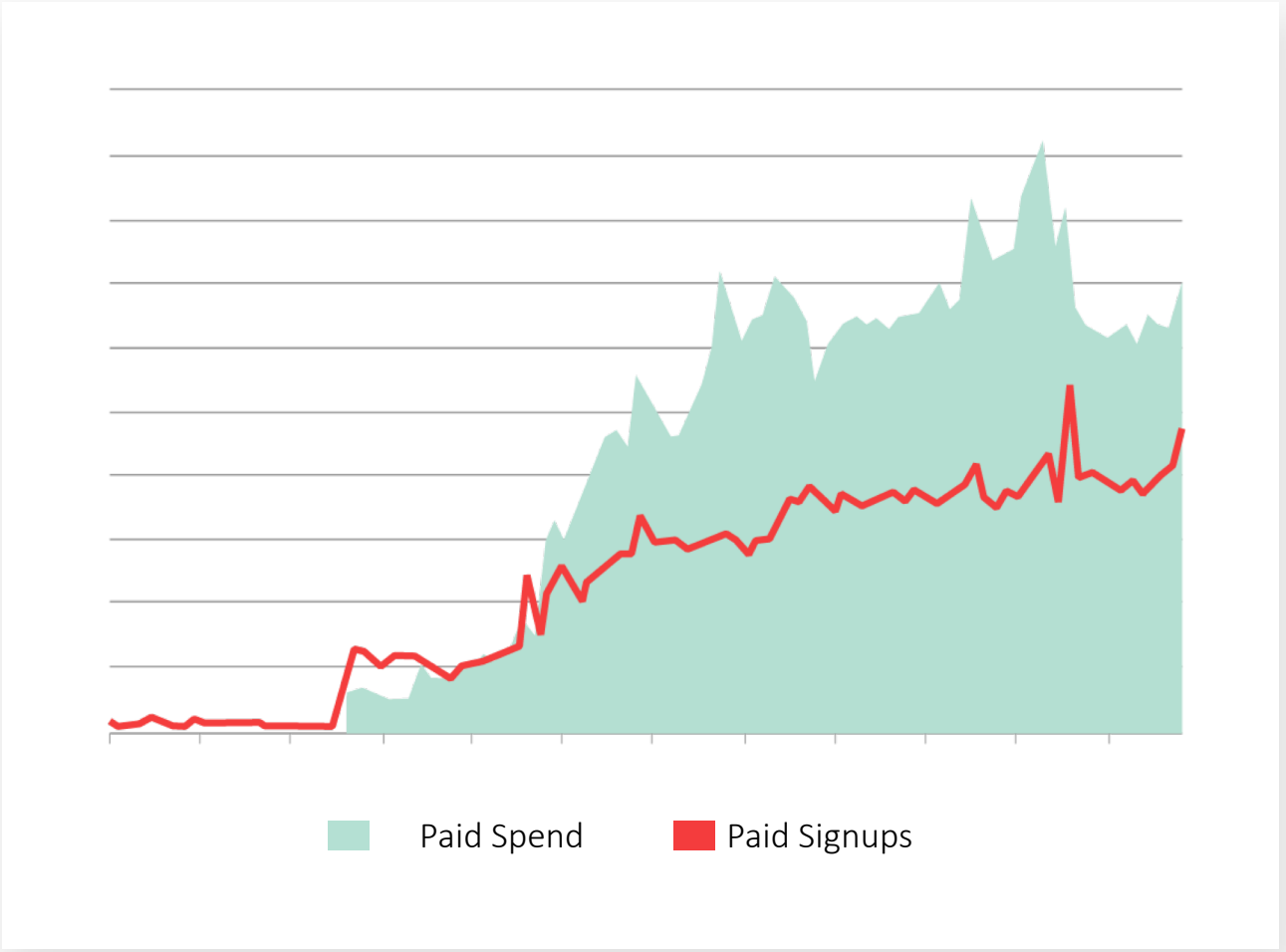
Kevin Frisch, Sr. Director, Performance Marketing and CRM

For the first 5 years,

Uber did very little conventional paid marketing. Growth happened organically due to great product market fit

In late 2016 we turned on rider acquisition

- Acquisition team was small, and had limited expertise
- Turned to Ad networks gave us riders at the lowest cost, so much of our spend was directed to them
- Success growing new users while generally maintaining cost per signup

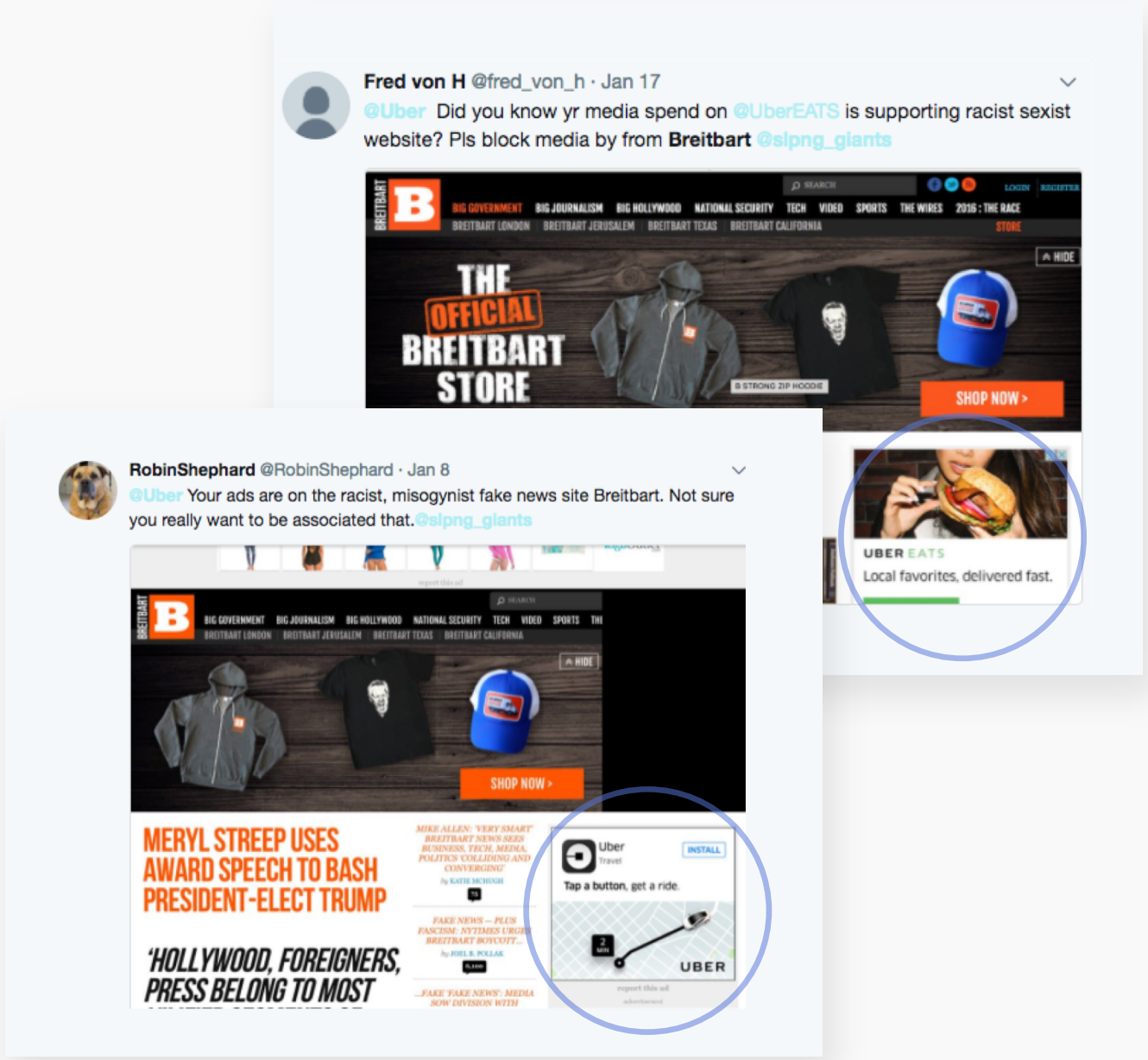


#DeleteUber happens… And with it, Breitbart

Told ad networks to make sure we stopped appearing, but our ads kept showing up

Began shutting down any ad network that was responsible

This would mean fewer new riders — never popular at Uber – and especially now with all those account deletions

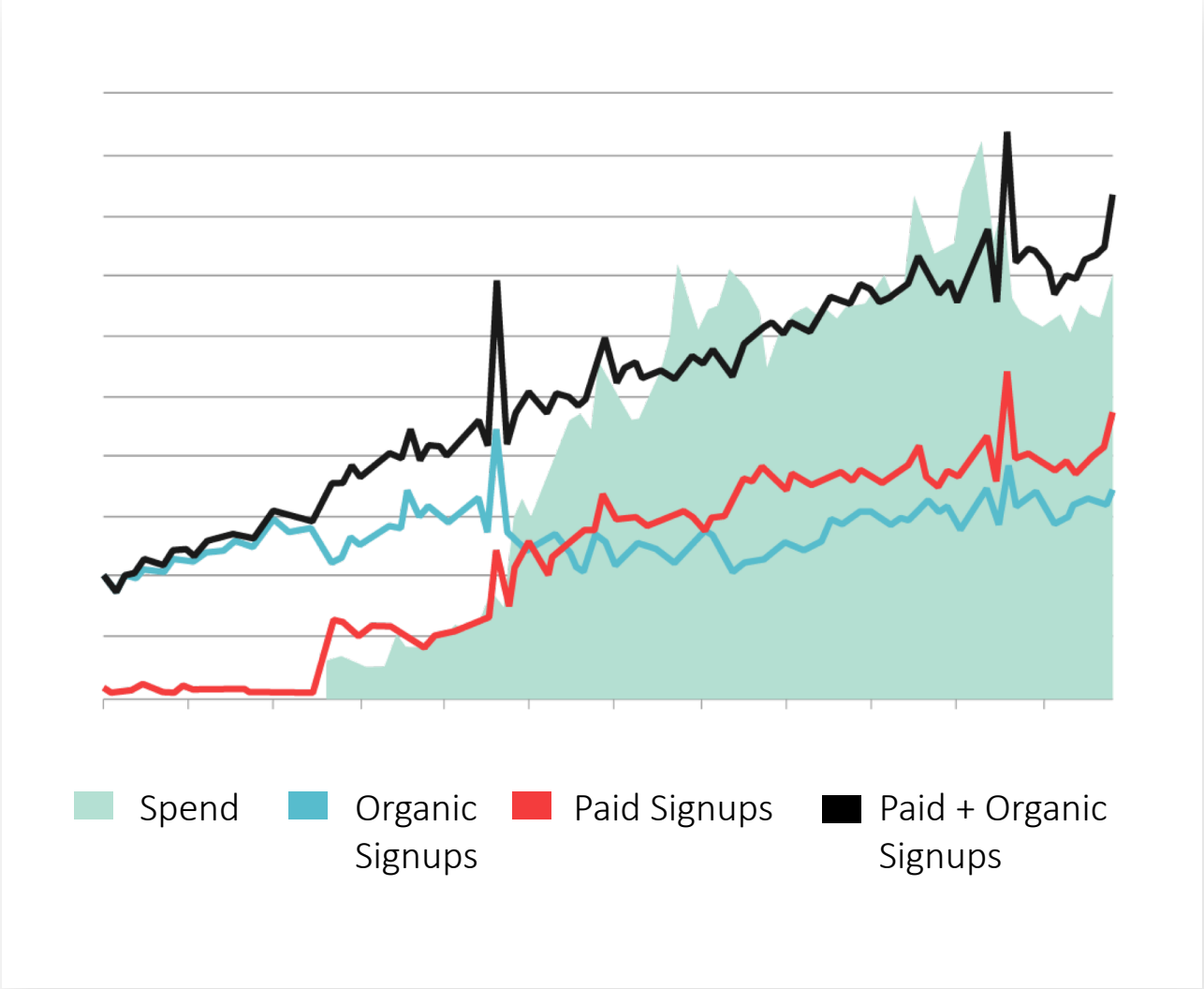


We'd shut off ad networks accounting for 10% of our signups and didn't see much of a drop

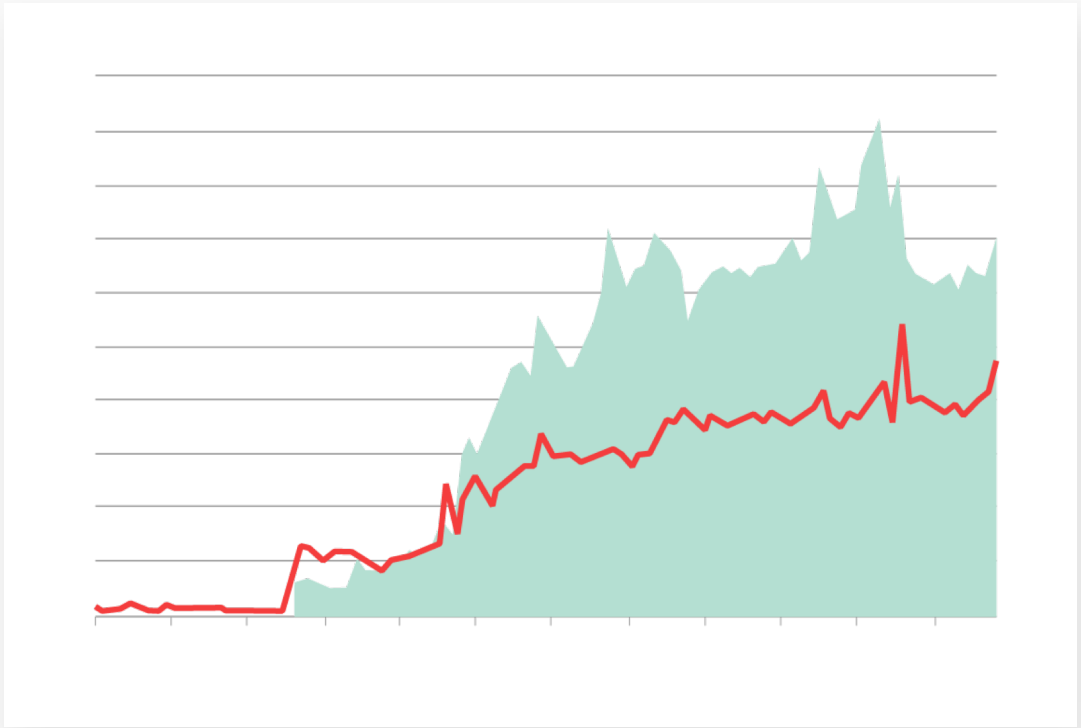
… some people felt relief

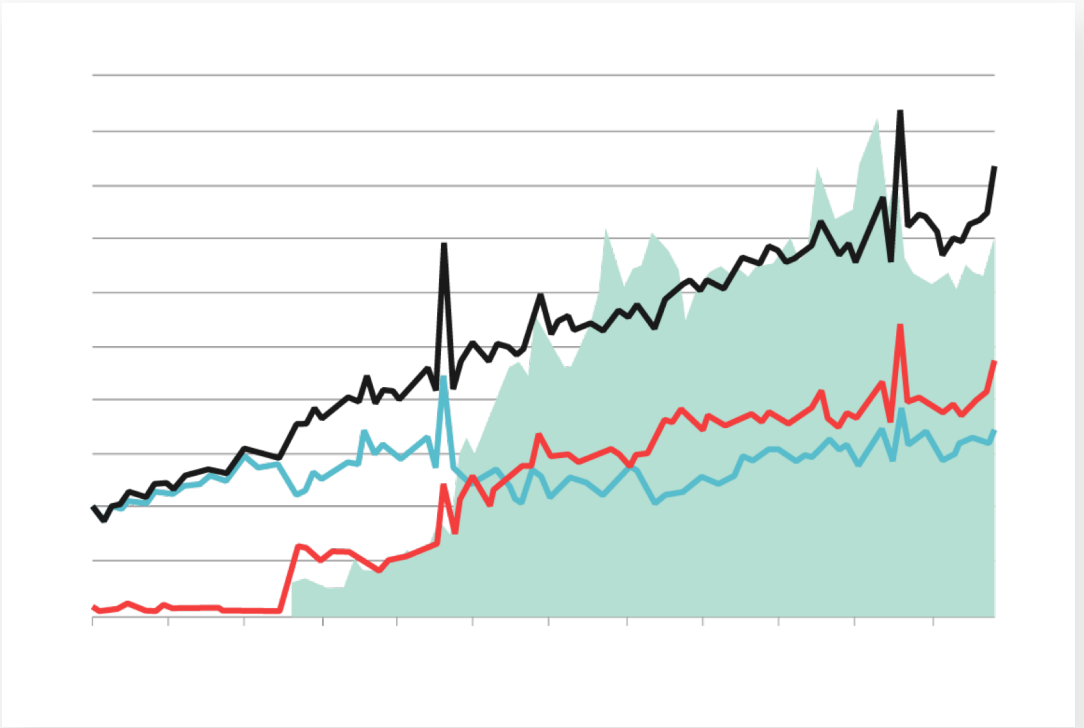
… but it seemed strange, so we started poking around

We looked at past data a little more holistically



Same numbers…
but looked at in the right context



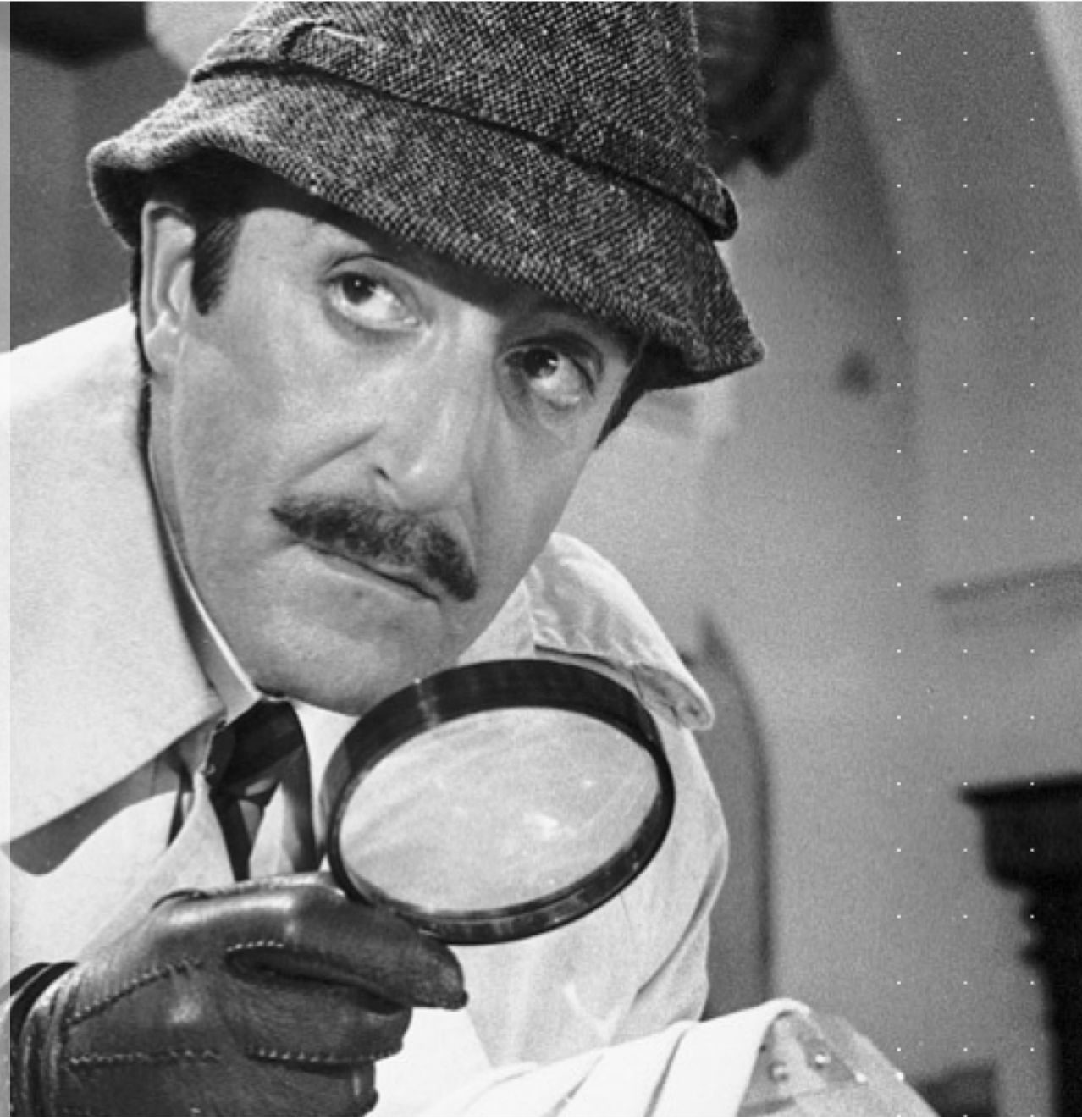


Spend Organic Signups Paid Signups Paid + Organic Signups

What was going on?

- Not set up to easily ingest click logs from our measurement partner
- Did some spot checking on a subset of logs
  - Showed publisher (App or Site), Clicks, Installs, signups

And then things got really scary...



This doesn’t look right!

… apps that had 4x more download than their MAUs

… click to install rates that are so low, they suggested there was no “intent” to the click

…publisher placement says the name of the app is one thing… but referrer url says something else (like Breitbart)

Same app, different partners

App	MAU	Partner	Monthly Clicks	CTR	CTI
App 1	**410,000**	**Fraud Partner**	**303,501**	**10.37%**	**0.15%**
		Other Partners	28,924	1.46%	1.87%
App 2	**320,000**	**Fraud Partner**	**520,005**	**27.30%**	**0.20%**
		Other Partners	13,172	0.37%	2.42%
App 3	**50,000**	**Fraud Partner**	**59,430**	**58.73%**	**0.19%**
		Other Partners	1,513	2.46%	1.36%
App 4	**5,000**	**Fraud Partner**	**89,590**	**16.31%**	**0.17%**
		Other Partners	120	0.01%	2.55%
etc		...	...	...	

Certain partners showed apps generating unrealistically high number of clicks
… so can be 10x higher CTR, and 1/10th CTI
… and had clicks out of line with actual app MAUs

Names of sites and apps are inconsitent and don’t make sense

referral_url	publisher_sub_placement_name
http://www.pornhub.com/	Crazy_Tribes
http://www.youporn.com/porntags/fu	Temple_Run_2
http://www.pornhub.com/	Unroll
http://www.youporn.com/porntags/tin	Shame_of_Chef
http://www.pornhub.com/	Convert_Units_Free
http://www.pornhub.com/video/searc	Crazy_Tribes
http://freejavhd.net/video/caribbeanc	Mp3Blaster
http://www.pornhub.com/	Temple_Run_2
http://www.pornhub.com/	Sonic_Dash
http://www.pornhub.com/view_video.	iBaloot
http://pornexpanse.com/zh-cn/gallery	Temple_Run
http://pornhdhdporn.com/perfect-ass	Temple_Run
http://pornexpanse.com/zh-cn/gallery	Temple_Run
http://www.pornhub.com/view_video.	Crazy_Tribes
http://m.pornsteep.com/top-rated/	Temple_Run
http://www.youporn.com/porntags/pr	Beach_Rescue
http://www.pornvube.com/	Temple_Run
http://pornexpanse.com/zh-cn/gallery	Temple_Run
http://www.pornhub.com/video/searc	Whats_That_Logo
http://m.pornsteep.com/video/meand	Temple_Run
http://www.pornhub.com/video?c=67	Sonic_Dash

Site Name	Clicks	Installs	CTI
MP3 Player	3,119,043	12,679	0.41%
Mp3_Pro	986,330	5,261	0.53%
MP3 Player 184	542,083	2,571	0.47%
MP3 Player 168	305,175	1,592	0.52%
MP3 Player 165	309,634	1,398	0.45%
MP3 Player 144	159,501	902	0.57%
MP3 Player 83	291,072	885	0.30%
Simple MP3 Music Downloader	197,899	761	0.38%
MP3 Player 57	169,192	635	0.38%
MP3 Player 65	179,929	576	0.32%
MP3 Player 59	116,216	496	0.43%
MP3 Player 36	105,839	425	0.40%
MP3 Player 54	135,353	422	0.31%
MP3 Downloader	111,053	414	0.37%
MP3 Player 166	89,907	403	0.45%
Easy MP3 Downloader	105,507	389	0.37%
MP3 Player 140	76,616	363	0.47%
MP3 Player 124	76,990	325	0.42%
Mp3 Player Pro	84,564	316	0.37%
MP3 Player 182	60,198	295	0.49%
MP3 Player 45	74,621	280	0.38%
MP3 Player 43	81,611	277	0.34%
MP3 Player 44	73,537	256	0.35%
MP3 Player 115	45,087	251	0.56%
MP3 Player 300	54,224	237	0.44%

“I don’t get it, we don’t pay the on views…or clicks.

We pay only when a rider actually takes a trip in a **real** car, with a **real** driver, and pays with a **real** credit card.

How can there be ad fraud?”

Welcome to Attribution fraud….

“The people are real, the clicks are fake”

Taking credit for installs that would have happened anyway by “generating” clicks on as many devices as possible

How attribution fraud works… just a few examples

Fat Finger Fraud

Ads that try to trick users to click on them so that the device has a recorded click

Click Injection

Malicious apps that generate clicks in the background – sometimes sending users to the app store, other times in the silently.

Stacking Ads

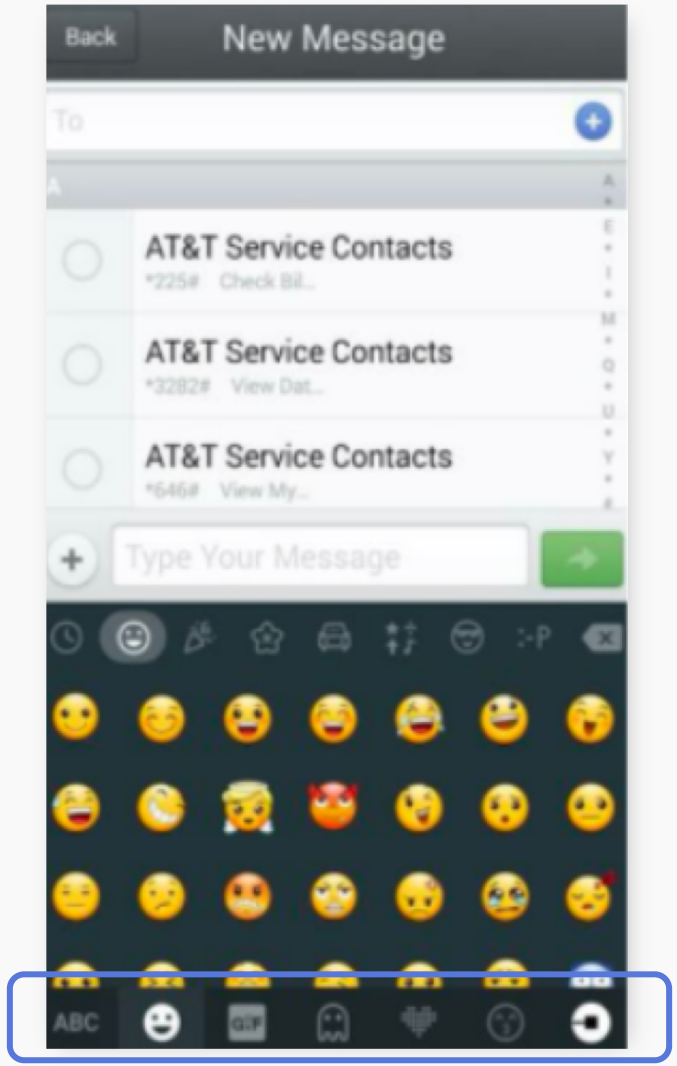
A user clicks on a single ad, but “underneath” it are many ads -- each for a different advertiser, many clicks sent to MMP

Click Spamming

Sending clicks for known device IDs or IP ranges to fool the attribution system (human hasn’t clicked on ad).

Taking credit for installs that would have happened anyway by generating “clicks” on as many devices as possible

“Fat finger” fraud in action!



You can detect fraud if you set your mind to it

Set up system to ingest all the data from our MMP…

Going back to start of 2016, 48.3 billion rows of data (each with 63 different variables)... 46.7 terabytes

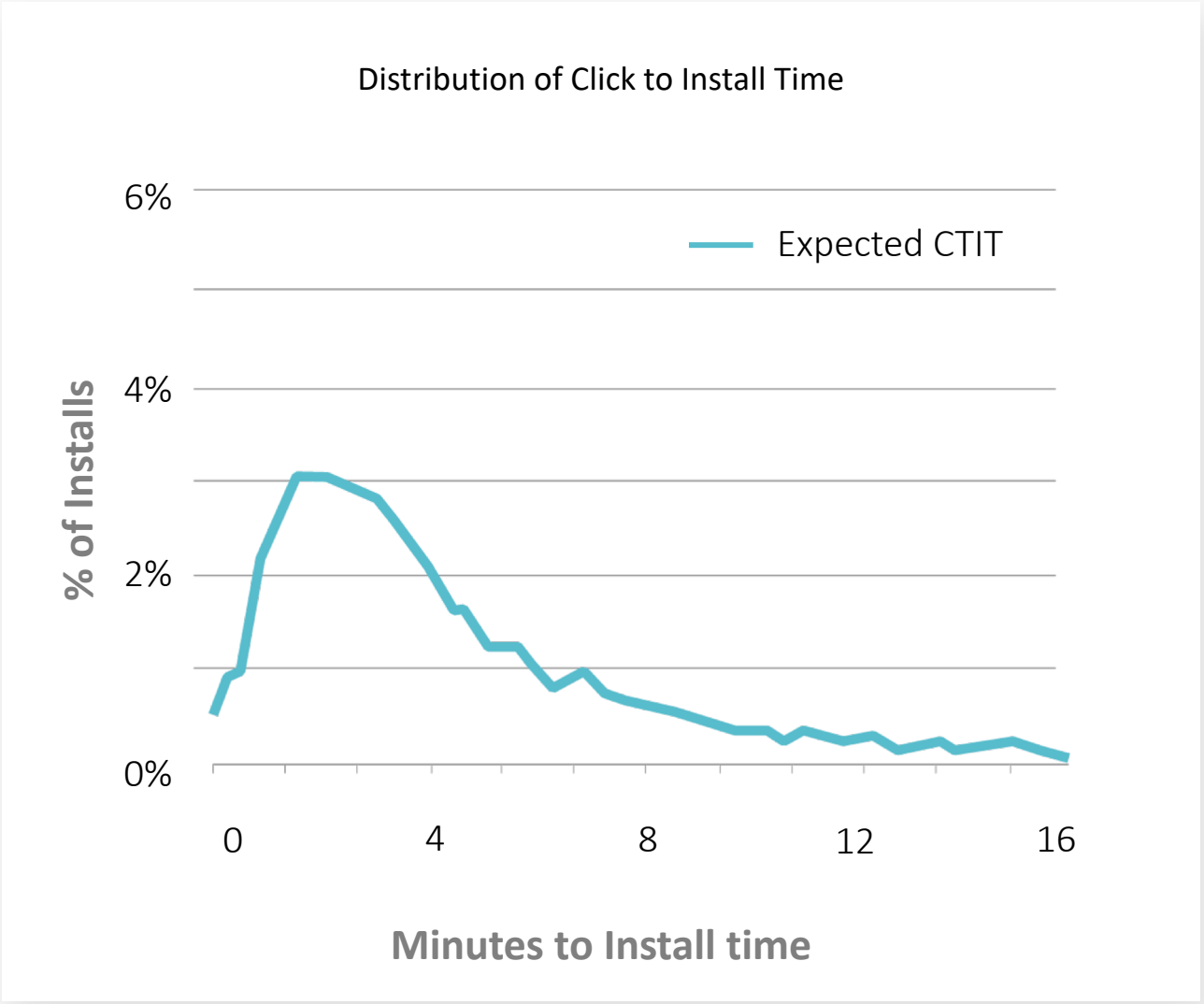
And going forward, ~208 million rows per day

Some things to look for:

- Too many clicks from a given app
- High CTR and/or Low click to install rate
- Single devices with way too many clicks
- Click-to-install-time distribution is “weird”

A typical distribution

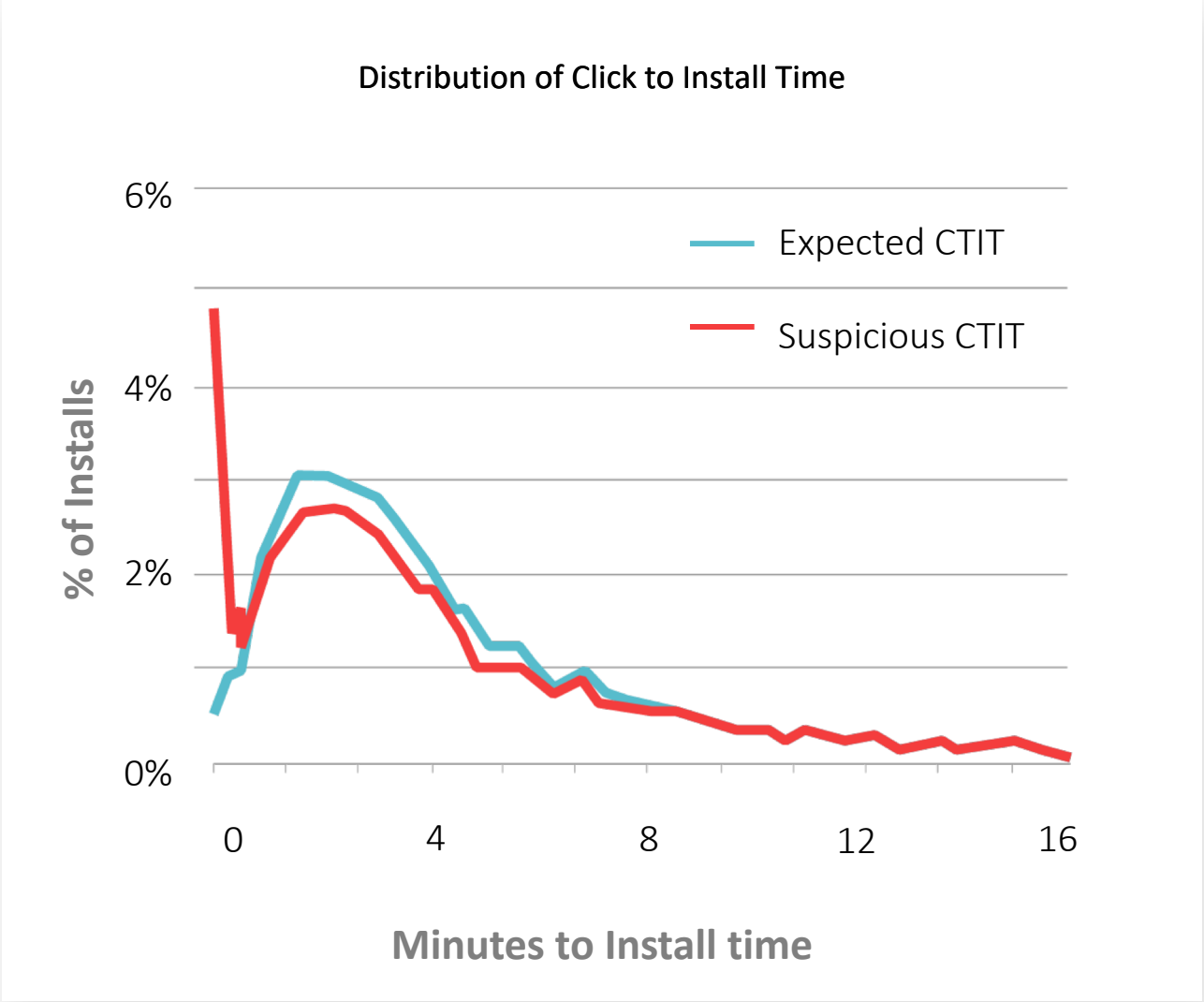
Peak of installs happen at about 2 minute mark, followed by rapid drop.



Click Injection

Distribution has a large spike with very short install times.

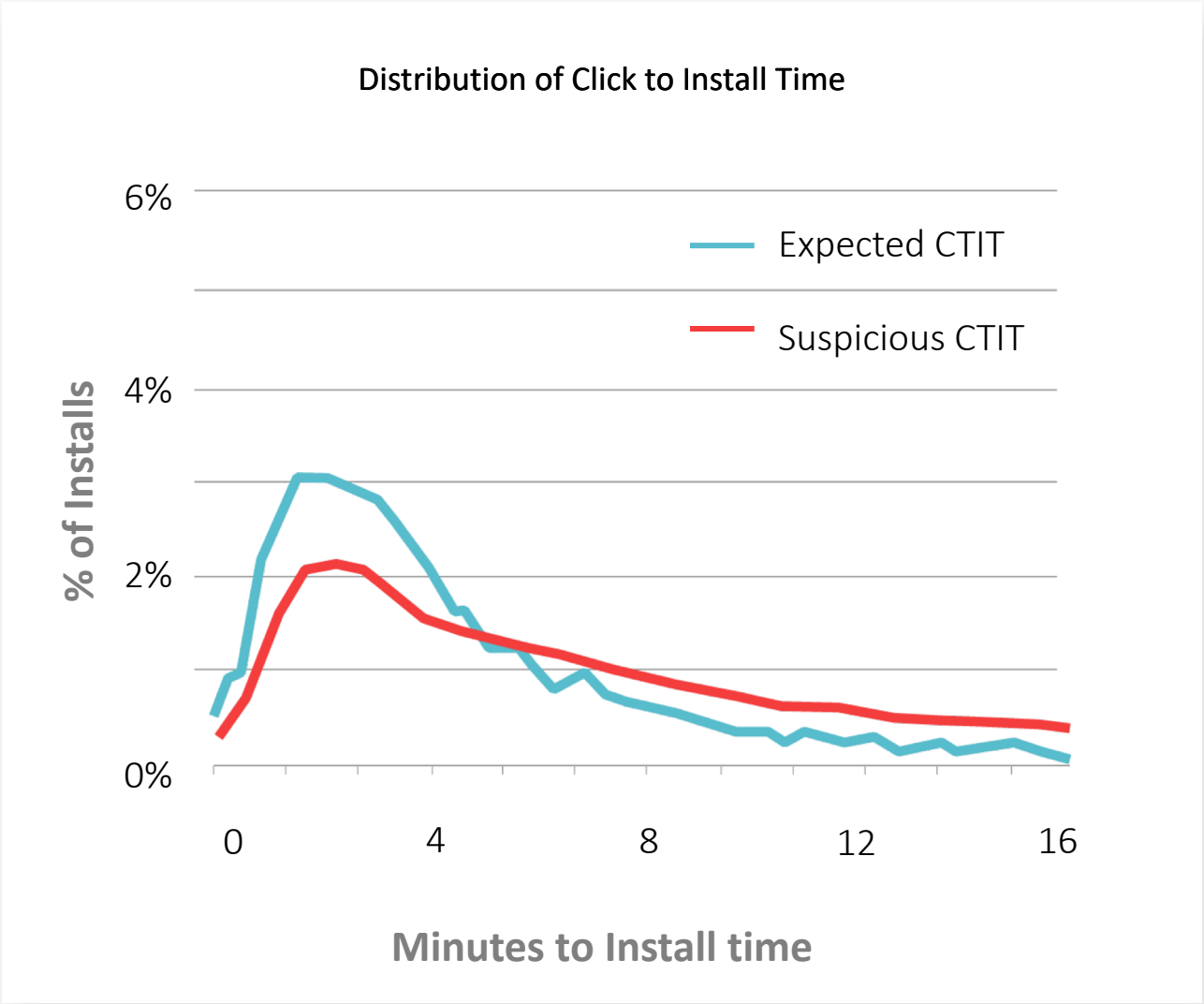
Click is being generated “just in time” when the the bad guys realize an install is about to happen (based on the activity of the user).



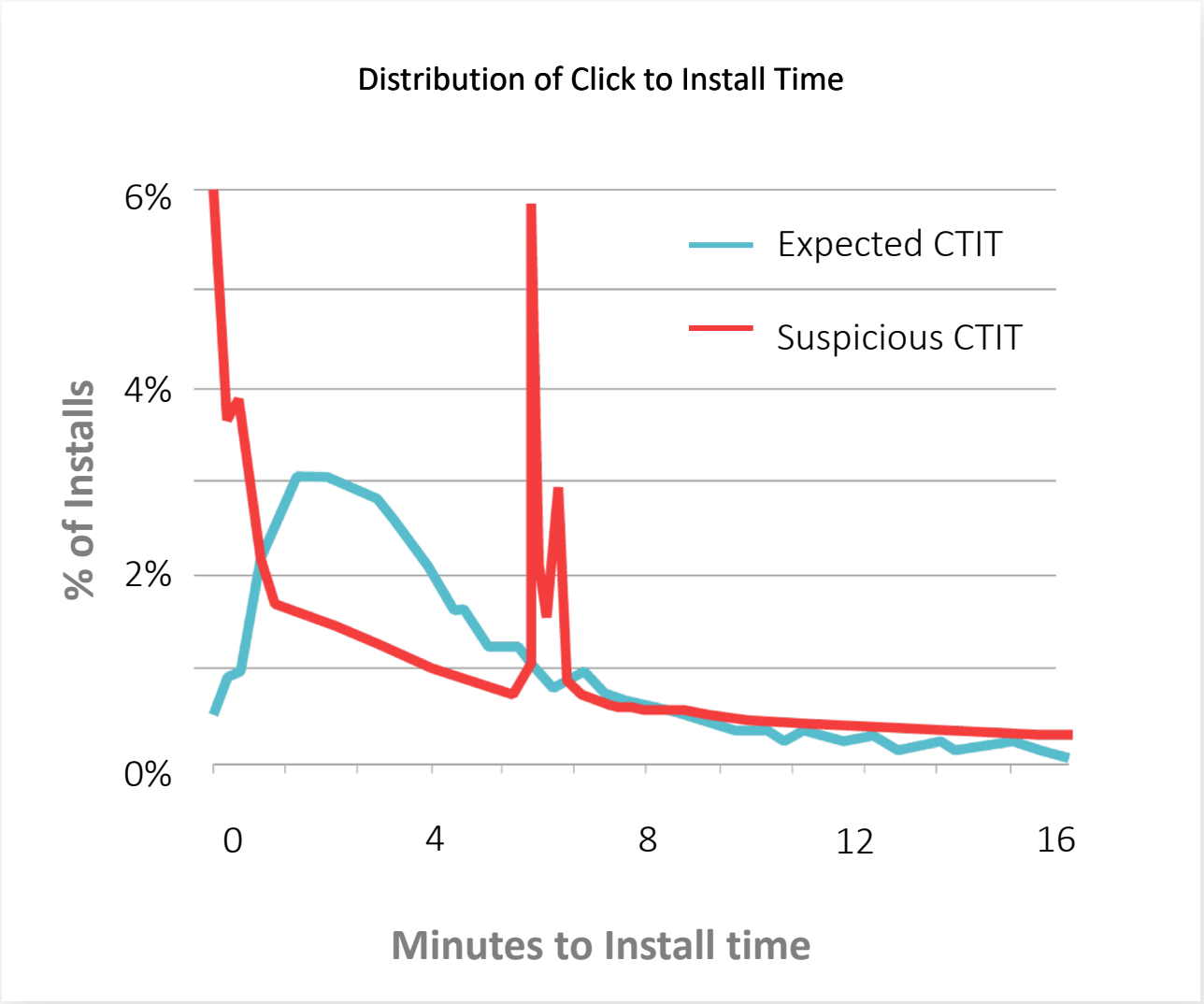
Click spamming

Tail of distributions is thicker than it should be.

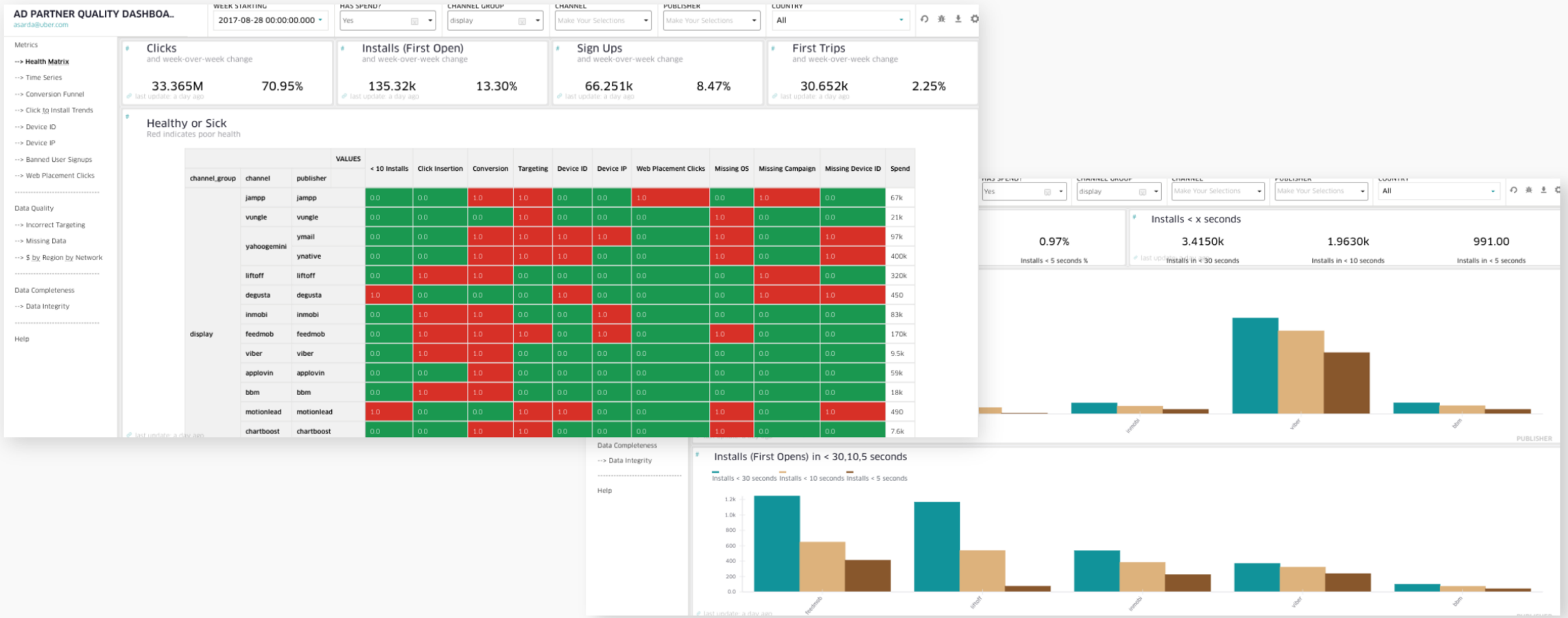
Clicks are not actually driving the install, so the time between “click” and install is longer since just waiting for an organic install to occur.



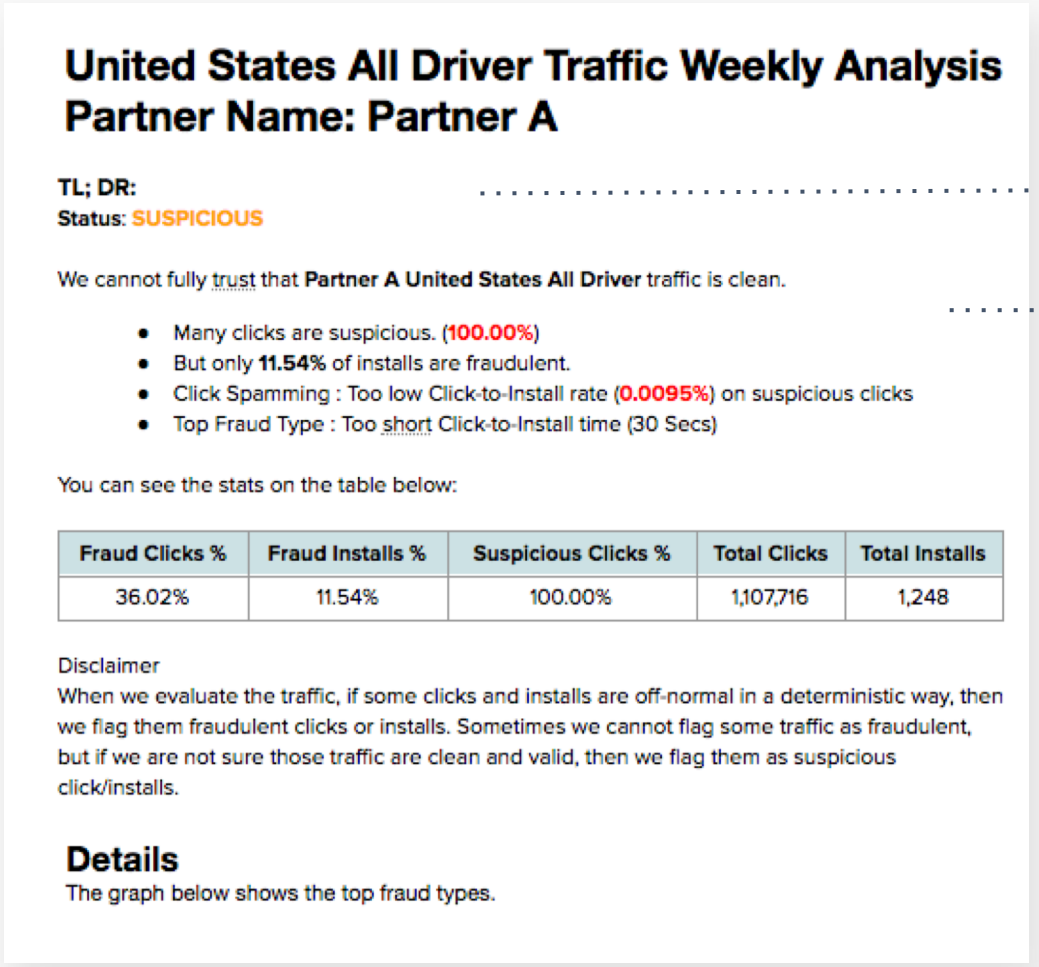
Yup…
just weird stuff



Created in-house fraud detection team…Dashboards and tools to allow team to detect fraud in real time



Automated Ad Fraud Report with Key Insights



United States All Driver Traffic Weekly Analysis
Partner Name: Partner A

TL; DR:
Status: SUSPICIOUS

We cannot fully trust that **Partner A United States All Driver** traffic is clean.

- Many clicks are suspicious. (100.00%)
- But only **11.54%** of installs are fraudulent.
- Click Spamming : Too low Click-to-Install rate (0.0095%) on suspicious clicks
- Top Fraud Type : Too short Click-to-Install time (30 Secs)

You can see the stats on the table below:

Fraud Clicks %	Fraud Installs %	Suspicious Clicks %	Total Clicks	Total Installs
36.02%	11.54%	100.00%	1,107,716	1,248

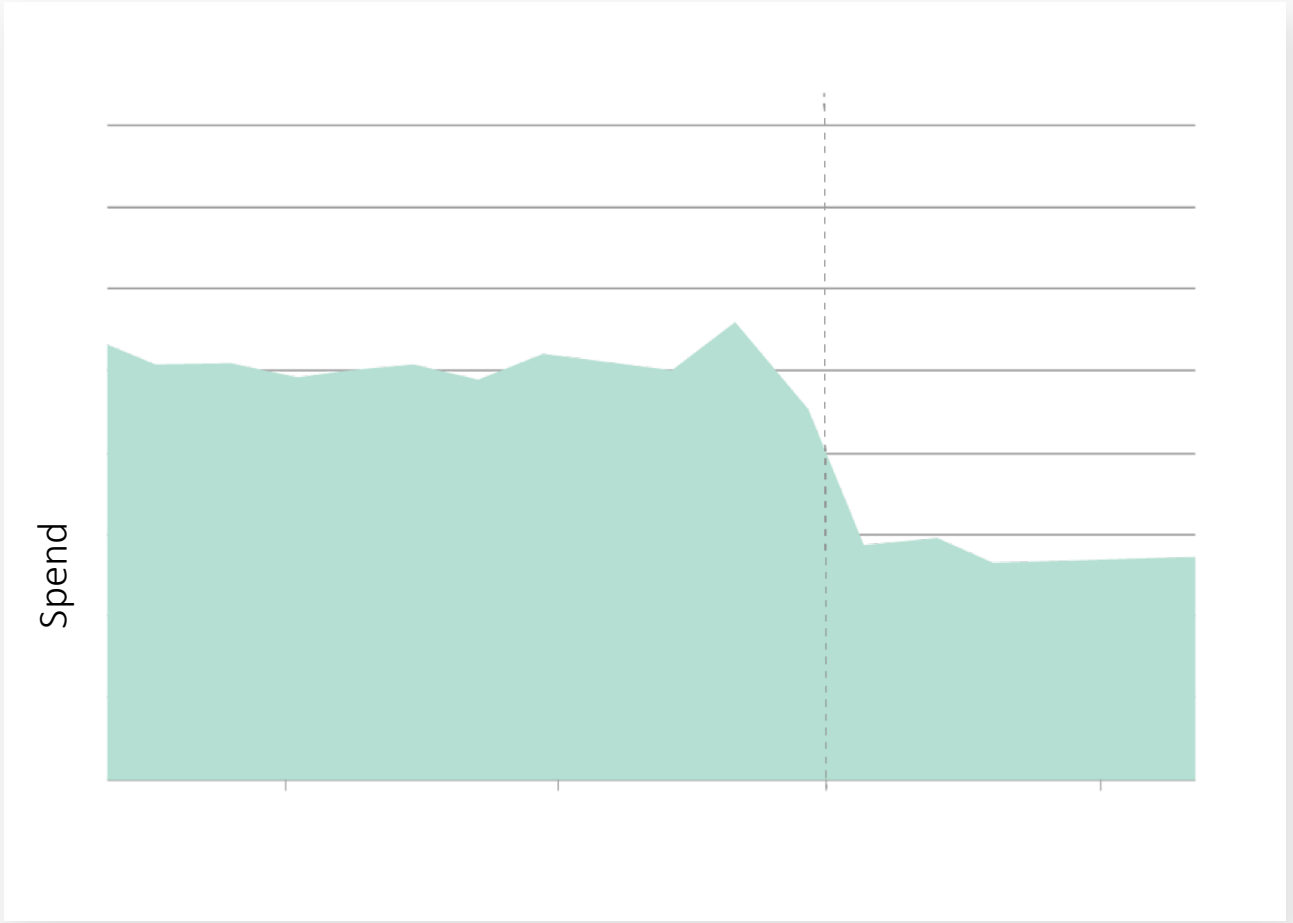
Disclaimer
When we evaluate the traffic, if some clicks and installs are off-normal in a deterministic way, then we flag them fraudulent clicks or installs. Sometimes we cannot flag some traffic as fraudulent, but if we are not sure those traffic are clean and valid, then we flag them as suspicious click/installs.

Details
The graph below shows the top fraud types.

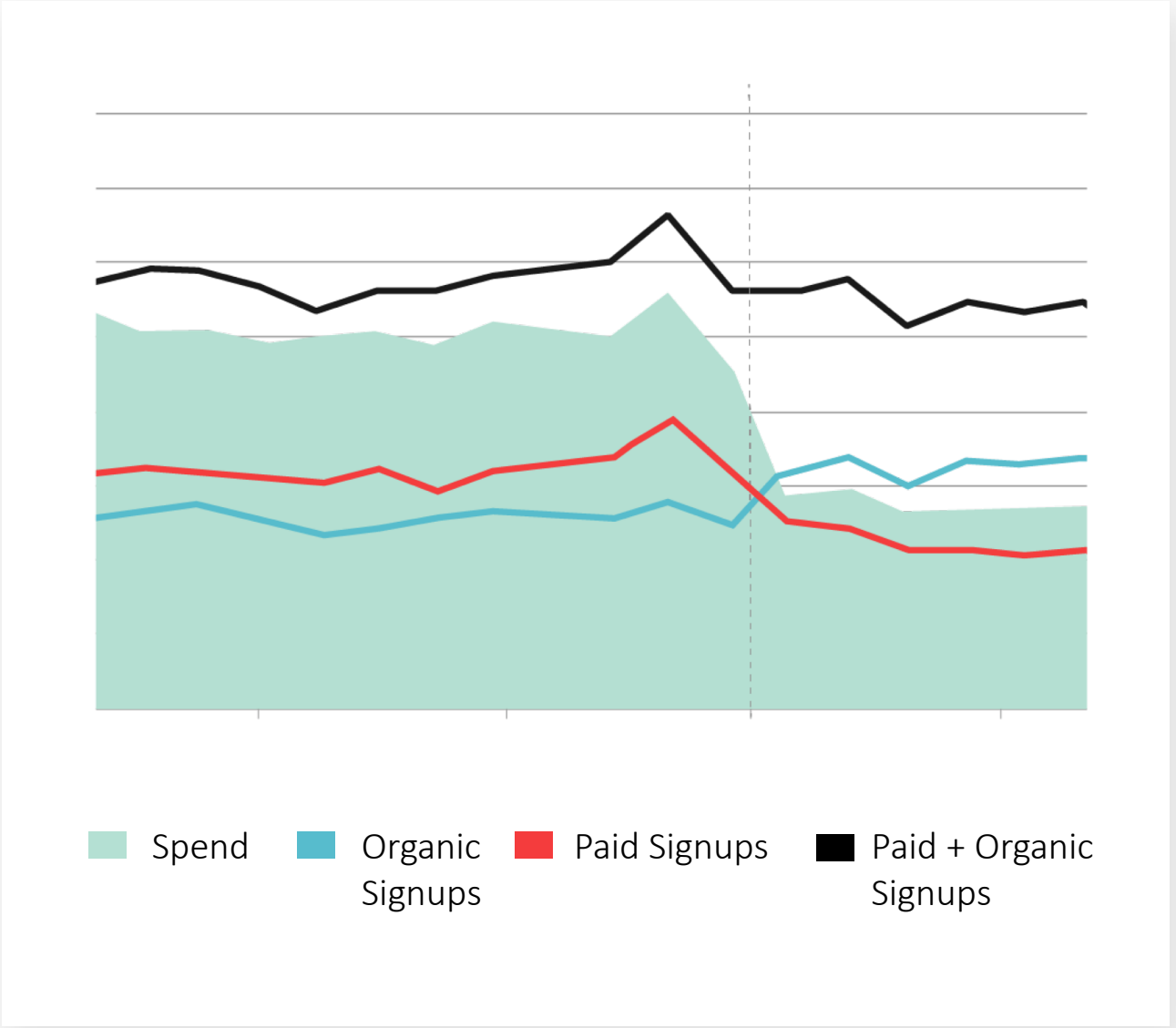
1. **STATUS**
   Clean, Suspicious, Fraudulent
2. **SUMMARY**
   How many clicks/installs are suspicious?
   How many clicks/installs are fraudulent?
   Key fraud types or schemes?
3. **STATS**
   Clicks
   Installs
   Fraudulent Clicks
   Fraudulent Installs
4. **DEEP DIVE**
   Detailed insights and stats for each fraud type and scheme

Based on our analysis, we turned off half of rider spend…

and held our breath as results rolled in



Signups fell, but only a bit… despite the drop in spend



Closing thoughts

- The mobile ecosystem is still rapidly evolving… new clever ways to rip off advertisers are constantly being developed
- Bad actors crowd out the good ones… fraudulant installs are cheaper than real ones
- Nobody should feel that “it can’t happen to me”

We would love to hear how other advertisers are dealing with this… and happy to share our learnings and tools.

Questions?