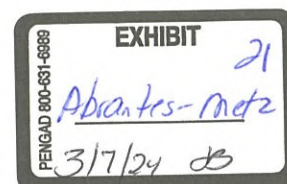




Overall Pub Yield With DRS(v2)

DRX: jimgiles@, whlin@, sgilpin@, maxl@
Research: renatoppl@, mirrokni@, nitish@

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Executive Summary

DRS consistently makes publishers more money.

Overall Impact:

- **+2.80%** lift in publisher revenue (including remnant)
- **+4.17%** lift in publisher revenue (excluding remnant)
- **+3.54%** lift in Google (AdX) revenue
- **+1.82%** lift in Google (AdX) profit (net revenue)

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Id	Date	Text
3	04/11/2016 13 16 59	<p>those numbers are over adx pubs</p> <p>If we look at the adx buyers on adx pubs, the numbers become</p> <p>8.9% lift in Adx revenue</p> <p>6.4% lift in Adx profit</p> <p>source</p> <p>https://rasta.corp.google.com/#/metrics?qs=0f68f4249_WywAlCJjb250ZQdhZHMlASlxOQ4QYRNkNDUTMwYTMhwDMmUWMxmKAwMR0wHTQdilljzHTIdNx0VA2QzYhOKQdi7igEooGQdNoYls4oGMdiomiuzZTWMUDZjl4FjSKwDM4sQNIjJYMYyyJhMBIdiKAQCOiN8xODEM-OOOWOWOcBjgjsuOI8Iio-I8VsABAYICgxfc2VsbGVyX25ldHdvcmsOj8LCwxj4LDCRiPsDBQcJdAtzX2J1eZCJCpDJDPeJgKRaPmOaRkwwXli0yinNjA0MDcwk9k-E5NZN5OY35PpP5F-CJiZXN0E3Jldgl1iiLDk1A2FnZ5TmdhCBOUmUsOkUjIkikxjxkUAJLo5Q</p>
1	04/11/2016 14 17 40	specify version of DRS
1	04/11/2016 14 42 37	<p>those numbers include remnant as well if we don't include remnant and measure only pub payout without remnant, we get 4.17% lift (on adx pubs) if we do adx buyers on adx pubs, the lift is 9.67% lift in pub revenue</p>
2	04/11/2016 14 42 37	that is the lift of DRS v2 (half-way with buy/pub side recollection) compared with no-DRS, since all the numbers in the deck are DRSv2 vs no-DRS

Google

Calculating Publisher Revenue

Publisher Revenue = **AdX Revenue + Third-party Network Revenue**

Third-party Network revenue = Sum(**remnant_cpms**) on queries unmatched by AdX, but served by remnant.

Do NOT count Standard + Sponsorship revenue: These Line Items are delivered in full by both Control + DRS up to contract, so no revenue impact.

Overall Impact of DRS: **+ 2.80%** publisher revenue increase.

Google

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Id	Date	Text
4	04/07/2016 15:44:39	measured over 2 days comparing the launch version of DRS (half-way randomized) with no-DRS. Will update to reflect 4 days soon.

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What if Remnant CPMs are Incorrect?

Publishers may enter incorrect remnant CPMs:

- If so, they lose money under existing (pre-DRS) AdX auction

Real CPM	Incorrect CPM	AdX bid (- Google Revshare)	Loss
\$5	\$4	\$4.50	\$0.50
\$5	\$6	\$5.50	\$0.50

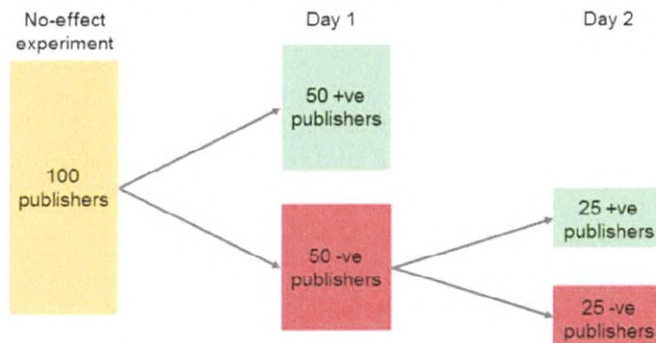
- *If they enter higher CPMs anyway* to compensate for (perceived) AdX unfairness, the following slides **underestimate** the benefit of DRS.

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Experimental Uncertainty

Currently running 1% experiment. Small traffic fraction \Rightarrow significant noise

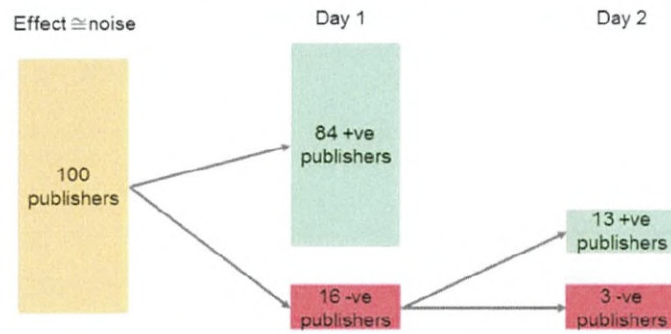


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Experimental Uncertainty

Currently running 1% experiment. Small traffic fraction \Rightarrow significant noise



Google

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Aggregate Statistics - Top 100 publishers

Data Sampled over 4 days. Revenue lift = **2.36%**

On average, 8 publishers lose money on any given day.

0 publishers lose every day.

If DRS was universally neutral:

- Expect to see ~50 of top 100 publishers losing money on any given day
- Expect to see ~6 publishers lose money **every** day

If DRS had positive effect = Standard Deviation(statistical noise*):

Expect ~16 publishers to lose money on any given day.

* - Assuming normally distributed noise

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Id	Date	Text
2	04/10/2016 17:16:21	can you say more about the 1 publisher who lost every day? Where is that publisher in terms of overall revenue (eg are they top 10 or top 20, etc)?
1	04/10/2016 17:24:57	I think it is really good that most publishers are doing well with DRS. But here are important questions we need to answer. What do we tell the publishers who are not? How do we explain the benefits to them? When we explain to the market what we are doing, how do we avoid questions about the scenarios where it helps a given publisher and scenarios where it doesn't? What should the publisher do who is losing money every day? Would we tell them they are losing money every day? I think the perception risk is the reason we may need to consider one of the alternatives in the appendix.
1	04/10/2016 23:30:10	They are #24 in total revenue, but this is "pure" noise. Their daily losses were: 0.26%, 0.08% and 0.12% respectively.
3	04/10/2016 23:54:38	ok that's not too bad.
5	04/11/2016 14:06:19	lifts for 2 days. will update with 4 days shortly.
2	04/11/2016 14:06:19	On day 4, they made a profit :)
<div>Google</div> <div>Confidential • Proprietary</div>		

Per-publisher Statistics - To

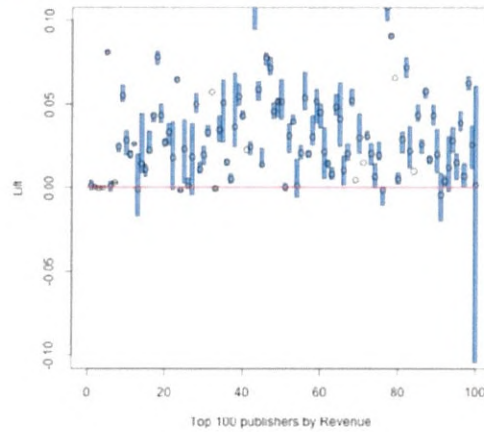
96 / 100 publishers make more money in aggregate.

Maximum loss: 0.22%.

1 publisher lost > 0.2%

22 publishers gained > 5%

5 publishers gained > 10%



Google

Aggregate Statistics - Top 500 publishers

Data Sampled over 4 days. Revenue lift = **2.71%**

On average, 43 publishers lose money on any given day. < 5 consistently

Zero publishers lost money every day.

If DRS was universally neutral:

- Expect to see ~250 of top 500 publishers losing money on any given day
- Expect to see ~31 publishers lose money **every** day

If DRS had positive effect = Standard Deviation(statistical noise*):

Expect ~79 publishers to lose money on any given day.

* - Assuming normally distributed noise

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Id	Date	Text
2	04/11/2016 04:18:19	We could add AdX numbers here as well - reminder of the "good for AdX" perspective
3	04/11/2016 04:18:19	Added to 1st (executive summary slide)

Google

Per-publisher Statistics - Top 500 publishers

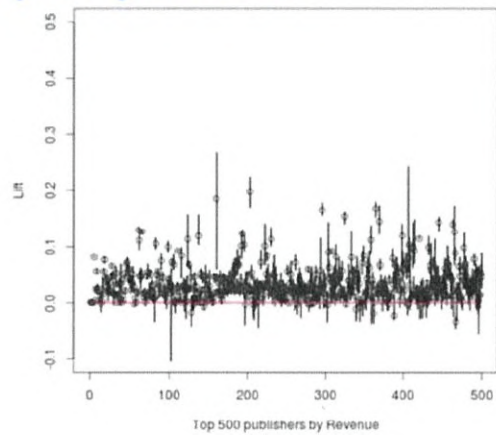
474 / 500 publishers make more money in aggregate.

19 publishers lost > 0.2%

9 publishers lost > 0.5%

105 publishers gained > 5%

26 publishers gained > 10%



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Publishers with per-query competing CPMs

Publisher may enter **average CPM** for third-party network LI, instead of **per-query CPM**

For header-bidding publishers, have **true* per-query CPM**. Daily lift:

Publisher	Day 1	Day 2	Day 3	Day 4
About.com	2.42%	2.11%	2.71%	2.80%
Trulia	3.55%	2.53%	3.85%	4.31%
Answers.com	4.12%	6.49%	4.97%	4.80%

For other publishers, analysis still accurate assuming correct average, and no correlation between competing bid and AdX highest bid.

Google

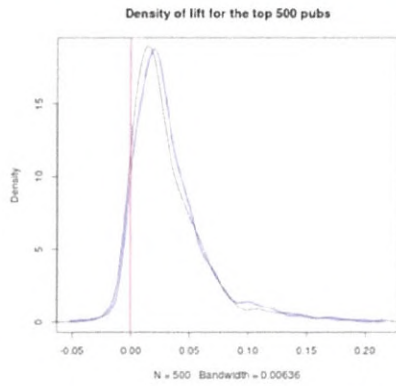
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Appendix

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Confirming Noise Effect - Top 500 publishers



blue = DRS v2

black = DRS v1

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Id	Date	Text
4	04/11/2016 03:41:21	What about DRS v1?
5	04/11/2016 04:35:15	i.e. the old version with both plotted together was really nice
6	04/11/2016 12:35:42	I updated the plot to use the current data
7	04/11/2016 12:35:42	I added the lifts for DRS v1 as well
<div>Google</div> <div>Confidential & Proprietary</div>		

Can Use Alternate Mechanisms

- Cautious recollection - guarantees that *per-query*, publishers make more money with DRS than without
- Turn off DRS if publisher is losing money
- Offer Opt-out option to publishers.
Options could be either opt-in, or opt-in to 5% experiment to demonstrate lift.

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Id	Date	Text
4	04/10/2016 23:40:06	why not do one of these?
6	04/10/2016 23:40:06	<p>Turning off DRS is a crude knob that will probably result in less publisher revenue, because half of the time this is just going to be noise, and it will be off at times when they could have made more money</p> <p>The cautious recollection is more promising, but it requires experiments to make sure we don't lose opportunities due to publisher throttling. Renato submitted the CL to implement it last week, and we're waiting for a mixer release to start experiments</p>
8	04/11/2016 00:42:08	<p>there are two ways to do that, either through IronMan (we monitor and turn off ourselves) or offering an opt-out. Do we want to discuss both options?</p> <p>For monitoring we probably want to define a margin of error saying when we believe a loss in revenue is significant enough.</p>
9	04/11/2016 00:42:08	The nicer way to do IronMan would be to switch to cautious recollection whenever you figure out that aggressive recollection is causing the pubs to lose money.
<p>Google</p> <p>Confidential & Proprietary</p>		

What about Other Alternate Mechanisms?

No publisher recollection - same gain in revenue, but we don't recover the revshare lost in DRS v1, so we have a 3.5x smaller lift in Google profit.

Experiment	Queries	Impressions	Revenue	Google Profit	Post Revshare Payout	Payout / Expected Revenue
DRS v1	222,109,974	197,068,557	331,185,543	66,499,577	264,685,712	0.8266
DRS v2 (buy only)	222,129,289	197,089,763	335,788,278	67,437,291	268,350,719	0.8263
	0.01%	0.01%	1.39%	1.41%	1.38%	-0.04%
	[-0.01, 0.03] %	[-0.01, 0.04] %	[1.33, 1.45] %	[1.33, 1.49] %	[1.32, 1.45] %	[-0.04, -0.04] %
DRS v2	222,126,111	197,091,137	335,814,721	69,729,025	266,085,329	0.8193
	0.01%	0.01%	1.40%	4.86%	0.53%	-0.89%
	[-0.01, 0.02] %	[-0.01, 0.03] %	[1.33, 1.47] %	[4.77, 4.95] %	[0.46, 0.60] %	[-0.90, -0.89] %

Impact on Adx buyers on Adx pubs

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