

Header and Exchange Bidding

Update - Mar 1, 2017

[November 10th deck](#) // [Oct 27th deck](#)

Jim

PTX0478

1:23-cv-00108

Exchange Bidding Product

Agenda

- Exchange Bidding Product Update
 - Market & Product Update
 - Changes to EB
- Follow up on action items from meeting of November 10th, 2016
 - Quantify impact of HB-exclusion on DBM
 - DBM Margin transparency
 - Non second-price auction defenses for fixed CPM DBM (Project Poirot)

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Sam

Internal Use Only - Confidentiality of the exchange is a critical part of the business model

Market Update - s2s is winning, but growing competitive threat from AMZN, AN & FB

- Amazon is testing competing s2s header bidding solution called Transparent Ad Marketplace ([link](#))
- AppNexus and Index Exchange also announced server-side header bidding ([link](#))
- Facebook has RTB bidder to bid into client-side & servers-side HB (e.g. Index Exchange)

Jedi Update - risk, but good next steps available

- **Revenue: ~\$40M ARR** from 5 exchanges transacting on 33 pubs (9% mApp / 24% mWeb / 67% desktop)
- **Exchanges: ~85% revenue still from Index**, behind on goal to have 2-3 exchanges at scale
 - Risk in concentration on one exchange
 - Rubicon, Sonobi & AOL still delaying because of mandate they bill pubs directly
- **Pubs: 33 live** - 66% of goal to have 50 pubs transacting by EQ1
 - 67 Beta candidates
 - Adoption in EMEA blocked on pubs using Rubicon

Launch timeline: Upcoming Open Beta in Apr 2017 pending resolution; continue to onboard strategic pubs during Beta

[\[Header adoption\]](#)

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- Held first bi-annual EB Steering Committee for exchanges on 12/8

Internal Use Only - Not for Distribution Outside of Google

Pubs: 33 live (66% of goal)

Increasing conversion

- Strategic matchmaking between HB pubs and EB exchanges

Increasing pub pool

- Expanding customer segments to pubs using HB or Avg. price LIs

Outcome to date

- Backing from sales/service team to increase beta pool from 50 to 70

Exchanges: ~85% revenue still from Index

Top requests from exchanges

- Fairness: removal of last look
- Direct billing

Decisions

- Give up last look: **Lose 3% of EB queries** to other exchanges, sacrificing 0.06% of EB revenue and 0.6% of EB profit.

Outcome to date

- OpenX finalizing scale contract with commitments
- FB, AN, PubMatic at table b/c of fairness
- Rubicon currently unwilling to move forward without direct billing

[\[last look details\]](#)

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- Giving up last look: price pressure converts to Jedi matches.
- Price pressure slice is about 3% of Jedi-eligible queries, which is itself a tiny fraction of all AdX queries.

In November, we presented DBM stopping to buy cross-exchange leads to ~34% imp. loss.

Breakdown from recent analysis:

Decomposition of DBM loss when turning off 3P exchanges



For HB Domains

- ☐ DBM wins back only 11% on AdX of the loss on the HB domains (89% loss)
- ☐ This would mean 33% loss of overall impressions to DBM advertisers for the HB domains (89% loss on 37% share from 3p exchanges)
- ☐ Revenue would likely not be as affected due to DBM being 90% budget constrained

Continuing investigation on desktop excl. deals/portals; Hypotheses and next steps:

	1. Budget Throttling	2. Higher price on AdX	3. Limited query access from AdX
Explanation	Budget constraints could randomly cause different bidding across exchanges.	Prices are higher for AdX via rules or by inflated HB LI prices / rules set higher price for AdX	Pubs only give partial access to AdX - or - HB higher priority in line items (LI)
Next Step	Experiment w/ turning off budget throttling. Buy-side proposed design to address.	Redacted - Privilege	Stop buying HB (via exchange flag), see if the inventory comes back via AdX.

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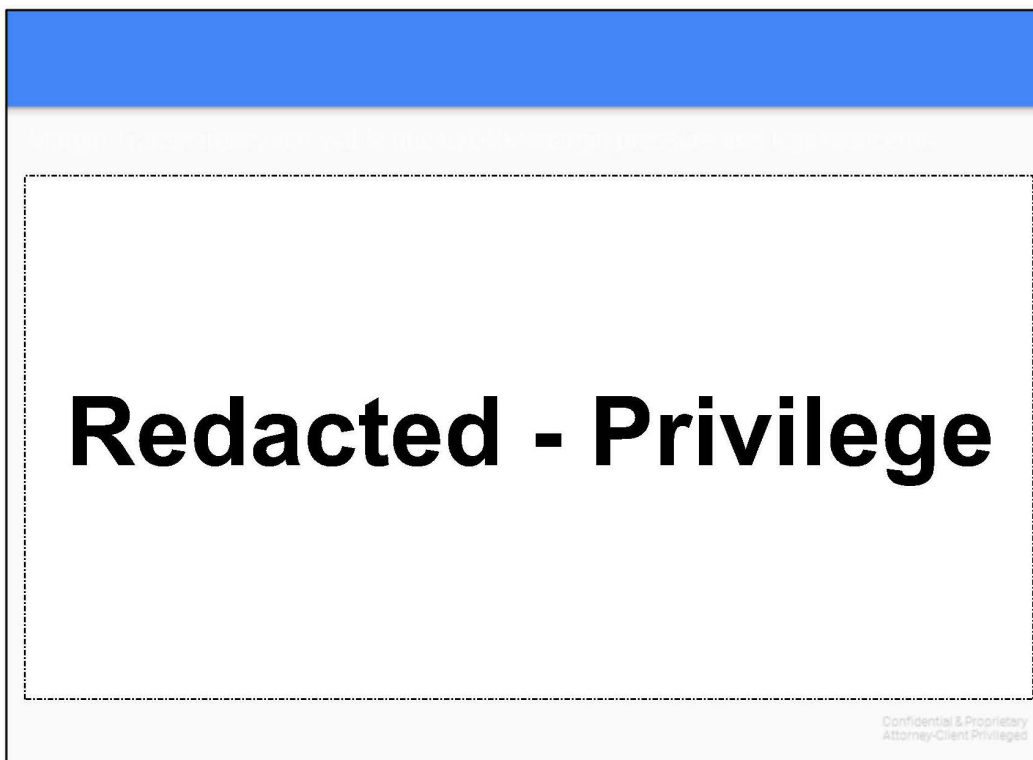
- the 8% loss represents 89% of what DBM normally buys on 3p exchange from HB domains

Loss is only slightly lower for known HB publishers (we expected the loss to be lower for known HB pubs)

Fraud ruled out as a reason for the gap via blackout exp. (turning off DFP for consented pub)

27% loss, if excl. deals

18% loss, if excl. 'portals' (msn.com, yahoo.com, aol.com, ...)



Jim

Redacted - Privilege

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Protection for DBM on track for Q2 launch

Protection for DBM on track for Q2 launch

- we're able to reduce bids and improve value added for advertisers on ½ of 3P Exchanges
 - impacted exchanges were previously detected to be non-second price
 - algorithm detects AdX as "does not require treatment"
- planning Q2 launch as **auction protection** w/ DBM fixed CPM advertisers default opted-in
- **separate meeting to review results scheduled for next week Thursday, 3/9**

While not a perfect HB response already addresses some HB issues and can be expanded:

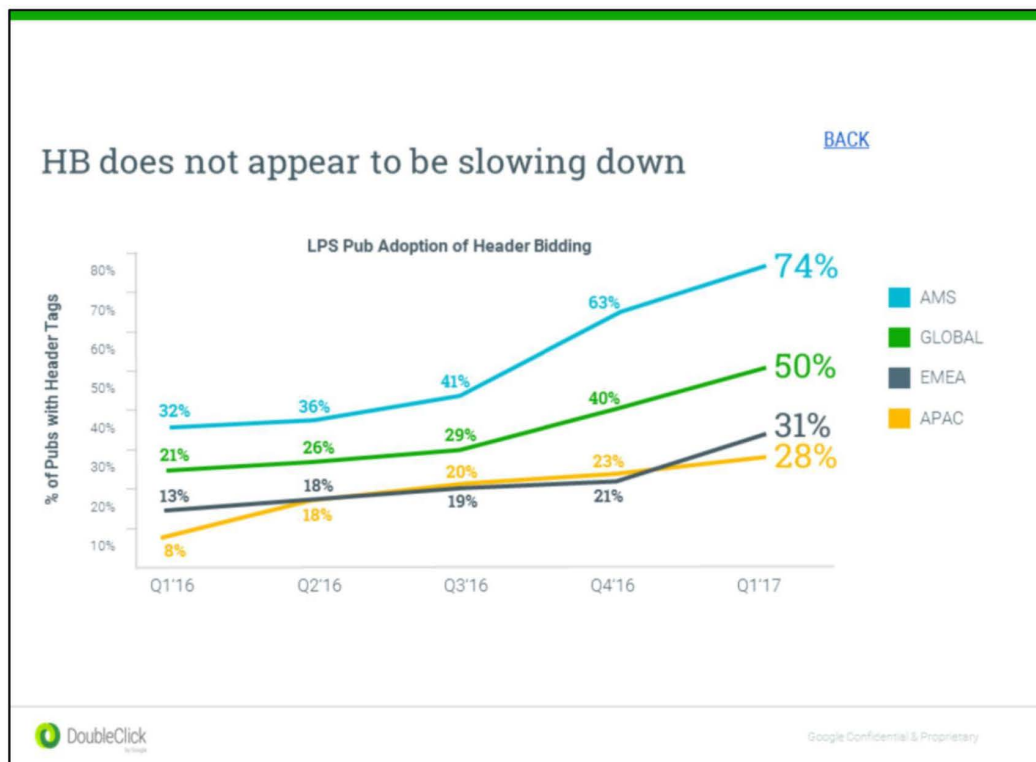
- The launch results in lower bids on first price auctions on cross-exchange inventory.
HB is first price.
- We are planning improvements on budget throttling, which will reduce bid variance in multiple calls of same inventory.
HB does lead to increased calls.
- (optional) we can choose to apply bid lowering at domain level, based on how much we win back on AdX.
Hypothesis is for HB we should win back more on AdX.

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Jim

Id	Date	Text
1	03/01/2017 20:40:08	+tmaurer@google.com Will we not adjust fixed bidding on AdX as well? in the case of RPO being enabled, this will add direct advertiser value as RPO will tend towards charging 95% of the fixed bid? I think we discussed this when we were talking principles of how to adjust fixed bid to account for non-2nd price.
2	03/01/2017 20:40:08	<p>- won't adjust fixed bidding on AdX as algoirthm doesn't detect AdX as treatworthy.</p> <p>- floors by itself doesn't make it second price auction.</p> <p>see our separate discussion on buy-side defenses</p>
<div> <p>Confidential & Proprietary Attorney-Client Privileged</p> </div>		

Appendices



As of Jan of this year 50% LPS adoption globally, 25% for OPG Tier 1

Step back to discuss how we got here:

Expected pubs to pick just 1 exchange

Managing multiple static priced networks was such headache, did not expect...

Esp since all had access to the same demand, except AdX...

Exclusive access to GDN plus contextual targeting, expected high adoption

Realized pubs were happy to work with multiple exchanges / Perception of 2nd price auction / Focus on making more money

Also pitching DFP abiding by our 'Own the Tag' strategy and delivering only Full Stack solution

Key pillar = Dynamic Allocation / Proved value of per impression competition

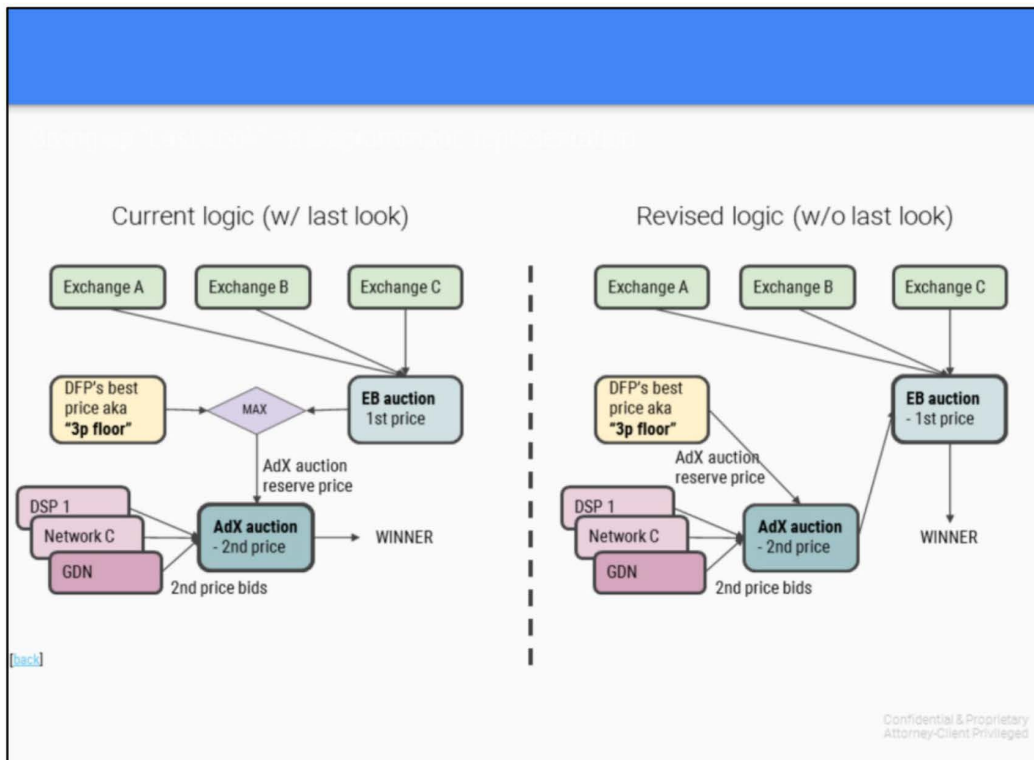
More important as user targeting (RMKT and ICM)

Exchanges = Not Fair / Networks wanted dynamic allocation everywhere

To be relevant needed a solution / Need met by HB

Criteo -> other networks and exchanges

Resulting in uplift for pubs



Id	Date	Text
1	03/01/2017 19:39:25	my 2 c - hard to read this slide much easier with actual bid examples
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DoubleClick
for Publishers

[Home](#) [Sales](#) [Delivery](#) [Inventory](#) [Reports](#) [AdX Query Tool](#) [...](#)

maxi@google.com
Hearst - Consolidated Network (36117602)

Orders

Line items

Creatives

Yield groups

Troubleshoot ETA

Targeting

Inventory

Key-values

Geography

Devices

Browse

Search

Back

+

Type to filter items

Ad units

included

1 item

Selected criteria

Reset

Inventory

Ad units

Run of network

1 item

Yield partners

DoubleClick Ad Exchange

DoubleClick Ad Exchange competes with yield partners for revenue optimization. [Learn more](#)

+ Add another yield partner

- Yield Groups targeting allows AdX competition by default
- Other demand sources added to target

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Slide graveyard

x% of cross-exchange inventory comes from portals (yahoo, aol, ...) not on DRX

- Should we directly tap into this supply via buy-side HB?

Pro

- We would no longer need to buy them through intermediaries
- Could be expanded to other pubs that choose not to work w/ DRX

Cons

- How do we ensure DRX is still the most attractive option?

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Id	Date	Text
3	02/28/2017 01:05:19	<p>+davidgoodman@google.com</p> <p>Do you know what % of inventory this is? This is an idea previously floated by</p> <p>+browley@google.com</p>
<div>Confidential & Proprietary Attorney-Client Privileged</div>		

What we know

- **Deals account for 6% of loss:** DBM buying only on AdX loses ~35% of impressions, when continuing to buy Deals on other exchanges, this drops to 29% (display inventory, video is x% vs y%)
- **HB pubs seem similar to non HB:** We assume AdX is more likely to have access on HB queries. However, when limiting analysis to domains known to use HB (and known to use DFP+AdX), the ~30% loss persists.
- **Reach loss seems similar to impression loss:** ~30% of user sessions have a callout to DBM from another exchange, but not from AdX
- **Mobile loss is half of desktop:** ~22% vs. ~42%. Proportionally similar effect from continuing to buy Deals on other exchanges.
- **Fraud seems small:** Blackout experiments very small effect on display: x% unauthorized/fraudulent, y% for video

OLD VERSION

Is it query access for AdX?	Unit pricing vs AdX	Are experiments needed to be refined?
<ul style="list-style-type: none">- Even on HB domains, not all queries available to AdX- HB (and so other exchanges) has higher priority in DFP <p><u>Next steps</u></p> <ul style="list-style-type: none">- Exp: only stop buying HB queries- correlation between AdX access and DBM loss- determine upper bound on DBM HB queries from logs	<ul style="list-style-type: none">- HB LIs have higher prices than exchanges can offer- HB queries match AdX rules with higher prices <p><u>Next steps</u></p> <ul style="list-style-type: none">- Exp: "DBM Bids High on AdX"	<ul style="list-style-type: none">- Budget constraints cause different bidding across exchanges <p><u>Next steps</u></p> <ul style="list-style-type: none">- Exp: turn off budget throttling when buying AdX

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Id	Date	Text
1	02/25/2017 19:25:08	<p>+whlin@google.com +jim Giles@google.com</p> <p>Did a summary here, PTAL. Some of the numbers are missing if you have them please fill them in.</p> <p>Proposed slide title: "~30% impressions loss w/o x-exchange buying persists after further investigation"</p>
1	02/27/2017 16:59:00	+maxl@google.com +nitish@google.com +nirmaljayaram@google.com
1	02/27/2017 16:59:00	This looks a big-domain desktop problem, btw. Interesting updates starting with Guillaume's analysis, and Goody, Guillaume and I have spent lots of time this morning. Will loop Nirmal in later today.
4	02/27/2017 17:42:33	<p>Next steps for 1, 2 on this slide all have big unknowns. Probably worth pointing out:</p> <ul style="list-style-type: none"> - stoping to buy HB : can't detect - DBM bids high : costly, not sure how to do simulation
<p style="text-align: right;">Confidential & Proprietary Attorney-Client Privileged</p>		

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Current performance: ~\$40MARR with 31 publishers and 3 exchanges live in Beta

- Revenue growth: \$110k/day in Feb'17 (5.5X increase from ~\$20k/day in Sep'16)
- Risk: High concentration of revenue from single exchange (90% from Index Exchange)

Beta: Strong push for fairness/transparency & differentiation against HB
Several decisions made to address feedback from publishers and exchanges (last look, sharing price to beat, cookie matching, bid data for Jedi+AdX opted-in buyers, streamlined opt-in, matchmaking)

Beta Launch timeline: Upcoming open Beta in Apr 2017, onboarding to our various strategic publishers during Beta;

GA Launch timeline: Q2 2017

Market Update

- Facebook has RTB bidder to bid into client-side & s2s HB providers such as Index Exchange
- Amazon is testing competing s2s header bidding solution called Transparent Ad Marketplace ([link](#))
- AppNexus and Index Exchange also announced server-side header bidding ([link](#))

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Contracts: require the publisher to declare that they have active contracts with exchanges

Matchmaking: allow publisher-exchange match-making for pubs using HB or SSP LIs (pre-emptive)

Floors: share DFP floors with exchanges in RTB callouts

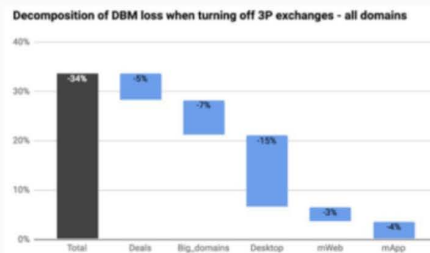
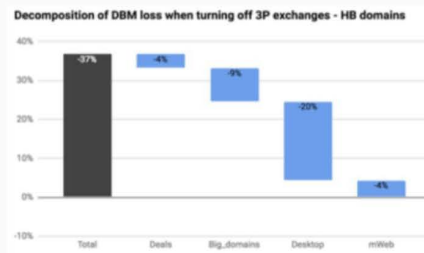
Bid data: share Jedi + AdX opted-in buyer bid landscapes

Billing: continue to provide Google billing (no direct billing)

Auction dynamics: give up last look

Id	Date	Text
3	02/27/2017 17:02:32	+gargisur@google.com - Somewhere on here should we mention the OpenX deal that +samcox@google.com is negotiating?
1	02/27/2017 17:09:46	The dashboard is out of date. We have been tracking the pubs directly with PSI until its resolved with gTech
2	02/27/2017 17:24:31	Based on information on last cross-fn comms both Sovrn and Cox are still testing. They were enabled for 2-3 pubs but having technical issues
1	02/27/2017 17:38:44	+gargisur@google.com - By my count from gojedi-dash we have 24 pubs and 5 exchanges live (transacting > \$0). Do you have a different data source with different counts?
2	02/27/2017 17:38:44	Okay. I still think our definition of "live" should be transacting > \$0. We have 5 exchanges live - 1 which has scaled a lot, 2 which are in process of scaling, and 2 which are not yet ready to scale.
1	02/27/2017 21:31:26	Change to expression of if we are on track for beta +gargisur@google.com +glevite@google.com +maxl@google.com
5	02/28/2017 02:53:48	suggest rewording of "controversial decisions" or explaining what it is. I'm assuming you mean "used beta to inform critical product decisions".
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Decomposition of DBM loss when turning off 3P exchanges - HB domains



HB domains: domains transacting through DFP, where HB tag is on page - sanitized for certain outliers, such as a, b, c.

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Id	Date	Text
6	02/28/2017 21:20:30	+nitish@google.com how about this?
<div>Confidential & Proprietary Attorney-Client Privileged</div>		

Question: "Last Look" which is ours? and the

Jointly reviewed **many different auction dynamics** including collapsing ADX completely into Jedi, making ADX first price, adding soft floors, allowing buyers to provide a minimum price for the Jedi auction, and giving up last look.

The Beta plan: Give up "Last Look" - AdX and other exchanges compete on equal footing

- Exchange bids will not floor AdX auction
- Second price ADX auction where demand from ADX buyers and Google will compete
- Closing price from the ADX auction will compete in a first price auction with the prices submitted from the other exchanges in Jedi

Benefits: 1) removes "last look" which is **one of the biggest complaints from exchanges**, 2) provides us with another differentiator between EB and HB, 3) increase exchange participation, e.g. Pubmatic

Risks: 1) ADX will lose more often without the last look advantage, 2) as Exchange Bidding ramps up, this will increase.

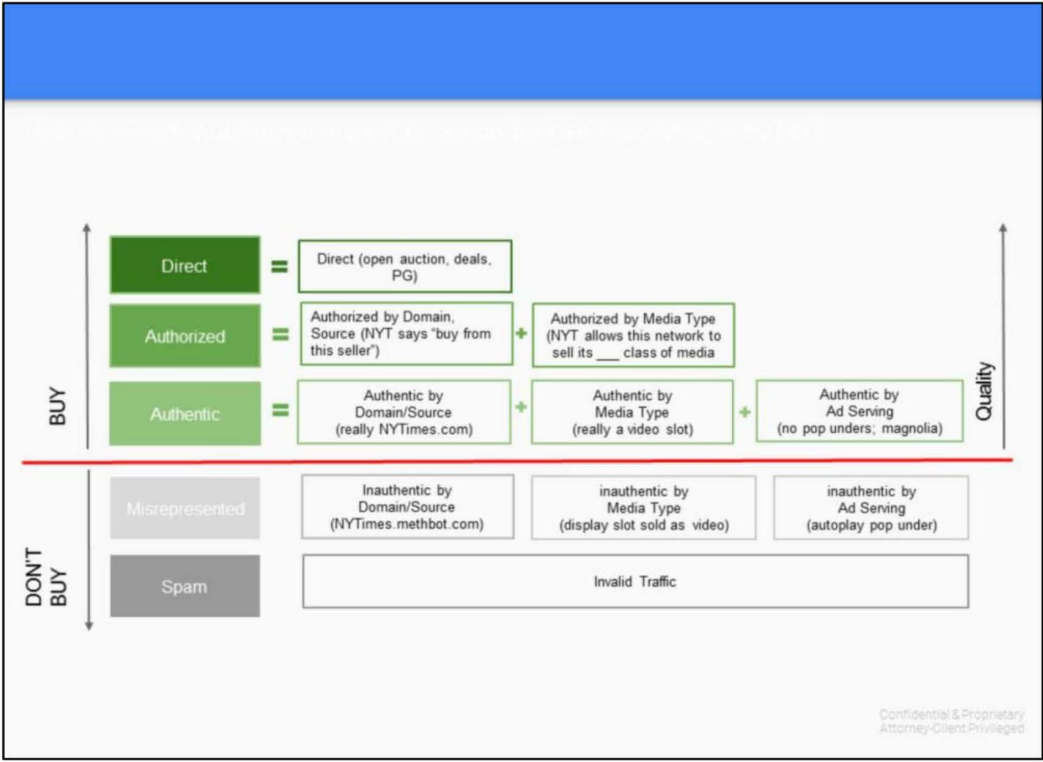
Why do we think this is safe? ADX wins because of Last Look today in 0.05% of ADX eligible queries. We are only getting about 5.62% effective margin for these anyway because of DRS and other optimizations. Shifting this to Jedi at 5% doesn't matter from a revenue perspective (lose 0.9% revenue and 15.99% profit on this 0.05% of queries). We can push RPO to win more of these back – ADX still wins 91.3% of Jedi Eligible.

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https://docs.google.com/spreadsheets/d/1Q9z79ObsDBt506wD6sQR8D2qXld3BsYb0D79H_r_sJM/edit?ts=58a4e8cf#gid=1720294072
ADX wins 8.66% of jedi eligible queries

Id	Date	Text
2	02/27/2017 18:08:06	<p>+jimgiles@google.com +nitish@google.com +mpal@google.com</p> <p>Risks summary from Martin:</p> <ul style="list-style-type: none"> - After giving up last look, it seems that majority of Jedi revenue will be cannibalization (i.e. every \$1 of Jedi revenue will be at the expense of >\$0.50 of adx revenue loss) - By giving up last look, a chunk of AdX revenue equal to ~90% of current Jedi revenue will be reclassified as Jedi - In other words, giving up last look will almost double Jedi, and this increase is purely non-incremental
4	02/27/2017 18:28:20	<p>on "benefits" should we state that several exchanges have stated that removal of last look would dramatically increase their willingness to spend on Jedi?</p> <ul style="list-style-type: none"> * OpenX contract amendment to get them to ramp up w/o last look * Pubmatic has stated this would likely be enough to get them spending * Index is willing to double down on Jedi because they think this is coming * if we're going to strike a deal with FB this would be a requirement <p>+samcox@google.com if there are other commitments he's heard of</p>
1	02/27/2017 18:28:20	<p>Based on numbers in Gargi's sheet:</p> <p>Without giving up last look: Jedi revenue = \$670k+\$1130k = \$1.8M This is the sum of actual revenue of JediMatch and JediSteal rows Without Jedi, this traffic would earn \$214k in AdX revenue.</p> <p>Current cannibalization is: \$214k/ \$1.8M = ~12%</p> <p>After giving up last look, the PricePressure slice will be won by Jedi. In that case:</p> <ul style="list-style-type: none"> * Jedi Revenue: 1670 + 670 + 1143 = \$3.48M * AdX replacement revenue (adx revenue from JediSteal+JediMatch+PricePressure slices, if Jedi turned off): \$214k + \$1111k = \$1.325m

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Id	Date	Text
1	02/22/2017 21:17:53	+samcox@google.com let me know how I can contribute here.
3	02/25/2017 21:48:02	I think this is a good representation of the blackout framework. Shree, do we have summary findings that we can put on the next slide to detail what we've learned so far?
9	02/27/2017 17:44:11	Also. Spam does have misrepresented filters and they are ready to be turned on any time BUT they do find a lot of false positives.
10	02/27/2017 17:44:59	Suggestion: change this slide to have the main point of introducing your concept of "authorized".
11	02/27/2017 17:46:08	also look here https://docs.google.com/document/d/1T4S7FX0Gy7TZa1d52zwTmM9wuuFHooljXuOhIKykRs/edit#heading=h.qs63bwt8jxux
2	02/27/2017 18:07:39	Need permission to view. I would argue that different buyers may want to make different decisions about what they want to buy. Performance buyers may choose to buy below the line (or we may make that choice for them) but brand buyers may make a different decision.
8	02/27/2017 19:44:34	The crux here is that we have no way to distinguish Authentic from Misrepresented. Classic example: live.com is not really msnb.com but likely just a misconfiguration and absolutely Authentic. And we have a save way to differentiate Authentic/Misrepresented, I'd argue the line needs to be moved one down, ie. we should only not buy Spam. Authorized/Direct is where we can give advertisers choice where they want to buy. +pshodjai@google.com
12	02/27/2017 19:44:34	given that this slide now is owned by buy-side, we'll change this to be about authorized sellers
2	02/27/2017 20:37:43	+samcox@google.com +shreem@google.com +davidmay@google.com
13	02/27/2017 20:37:43	based on discussion today, it sounds like this should be about the plans to launch authorized inventory option for dbm adv, rather than blackout experiments and insights. do you agree?
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ADDITIONAL INFORMATION FROM THE MEETING

Jointly reviewed **many different auction dynamics** including collapsing ADX completely into Jedi, making ADX first price, adding soft floors, allowing buyers to provide a minimum price for the Jedi auction, and giving up last look.

The Beta plan: Conceptually, there will be a second price ADX auction where demand from ADX buyers and Google (but not other exchanges) will compete. The closing price from the ADX auction will compete in a first price auction with the prices submitted from the other exchanges. In this way ADX and other exchanges are completely on equal footing. We are giving up **"Last Look"** for Exchange Bidding, but will keep it for Header Bidding.

The benefit of the beta plan is that it removes "last look" which is **one of the biggest complaints from publishers and exchanges**. It provides us with another differentiator between EB and HB.

The risks of the beta plan are that 1) ADX will lose more often without the last look advantage, 2) as Exchange Bidding ramps up, this will increase.

Why do we think this is safe? ADX wins because of Last Look today in 0.05% of ADX eligible queries. We are only getting about 5.62% effective margin for these anyway because of DRS and other optimizations. Shifting this to Jedi at 5% doesn't matter from a revenue perspective (lose 0.9% revenue and 15.99% profit on this 0.05% of queries). We can push RPO to win more of these back – ADX still wins 91.3% of Jedi Eligible.

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https://docs.google.com/spreadsheets/d/1Q9z79ObsDBt506wD6sQR8D2qXld3BsYb0D79H_r_sJM/edit?ts=58a4e8cf#gid=1720294072
ADX wins 8.66% of Jedi eligible queries

Id	Date	Text
2	02/26/2017 06:48:29	Jim, let me know if you need updated data for this, or if you're all set.
3	02/26/2017 21:37:51	+mpal@google.com +gargisur@google.com I think we need updated data here - Martin/Gargi did you pull this recently?
2	02/27/2017 02:24:59	Yes, they did -- I'll grab it and fill this in
3	02/27/2017 04:29:07	+jim Giles@google.com
3	02/27/2017 04:29:07	https://docs.google.com/spreadsheets/d/1Q9z79ObsDBt506wD6sQR8D2qXld3BsYb0D79H_r_sJM/edit?ts=58a4e8cf#gid=1720294072
3	02/27/2017 14:53:11	Jim, added less wordy version of current one in slide 5
1	02/27/2017 15:15:29	+maxl@google.com +glevitte@google.com +gargisur@google.com this has to be reworked probably (too wordy), but I wanted to get something. Do we want to include the slides from "winning with EB?" https://docs.google.com/presentation/d/15LnGpNR8FdF80PnnkKOUmQZ1yEU-Ldm_3ezRhmjeLBc/edit#slide=id.g20a9f96b60_0_0 either here or when we talk about the product? I think some of them are pretty good and would be of interest. We might also want one on extended cookie matching. I pasted the slides at the end of this deck in case we want to use them.
5	02/27/2017 15:15:29	How much of the review should be on Jedi updates vs other stuff (30%, fraud experiments, etc)? At very least we might want to give the VPs a sentence on each of the contentious changes from "winning with EB". Should those be mentioned here or in the separate product update further down?
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Nov 10th Options recap and proposal

November 10th, 2016

Jim

		Discussed 10/27 (green means Paul/Eisar asked us to investigate, red means no follow-up needed)	Executive summary of current assessment
1	EB++	Build more competitive JEDI product, fast track development	Jointly (buy/sell) think that it is important to keep moving on Jedi, consider making improvements but no need to do very expensive things like blocks/categories/floors across exchanges yet.
2	Open Jedi	Open up access beyond exchanges to networks and small SSPs, direct billing	We still think this is a bad idea. Better to give buyers incentives to be on ADX.
3	Lower AdX revshare	Reduce sell-side auction revshare	Based on simulation results and sales estimates, this no longer looks like it would provide enough benefit.
4	Accelerate Deals	Programmatic buying (PG and PNG, Guarantees w/ buyer decisioning) should support any deal that can be implemented via DFP tags	Planned for Q1/Q2. Enable standard line items with full priority control to plug into DBM/AdX buyers. No requirement for buyer to bid. Replicate HB setup with 100% programmatic.
5	Full bid landscape	Share GDN/DBM spend per exchange, domain with publishers	We still think this is not feasible except for cases where we offer first price/soft floor/hybrid auction.
6	Prevent self flooring / TAG	DBM/GDN do not buy ANY HB queries	Learned that it is not as simple as skipping other exchanges because of potential reach impact (not fully understood). TAG PaymentID not good option as it's gameable.
7	Payout transparency	Redacted - Privilege	

Jim

Follow up from Oct 27th

- Margin change impact (simulations + sales input)
- Buyside changes buying to avoid self-pricing (incl. "TAG" industry standard approach)
- Buyside transparency to publishers (a DBM report for publishers)
- Jedi roadmap (if we make the proposed changes)

Jim

Margin (AdX, GDN)	Gross Revenue	Net Revenue	Publisher Payout
Recommended			
Current	No change	No change	No change
15%, 20%	-1.95%	8.61%	0.70%
10%, 25%	-3.76%	16.81%	1.45%
5%, 28%	-5.42%	24.68%	2.25%
0%, 32%	-6.75%	31.57%	3.14%
10%, 20%	-3.98%	23.85%	3.94%
5%, 20%	-5.90%	38.73%	7.19%
0%, 20%	-7.25%	51.56%	10.43%

Results in table are based on simulation.
[full model](#)

Sales feedback on impact of cutting rev share:

- Would not help win new business in head-to-head competition
- Would not help open new inventory on existing DRX pubs in existing market
- Discounts are being applied for top pubs today, not seeing significant margin erosion*

Recommended next steps:

- No change to standard sell side margins, continue offering discounts as needed to win business
- Could consider *increasing* EB revshare, but this will be tough with Amazon 1c EB.

Could consider going to 15%/20% to make AdX more competitive, would make it easier to justify increasing DBM margin for optimized buying

*: OA avg rev share is 19.3%, down from 19.8% 5 years ago; total AdX blended avg (OA, PA, PD, PG) is 18.8%

Jim

Things not modeled well here:

- 1) What is inventory access increase
- 2) what is increased ROI from DBM / 3p buyers and does this result in more spend.
- 3) how much do we make up from new buy/sell opt changes

<p>Not buying top 300 LPS HB inventory cross exchange (pubs account for 20% of DBM overall spend):</p> <ul style="list-style-type: none"> -34% revenue (-6% overall)* -30% impressions** <p>*: some of the revenue may be recovered due to 80% of the campaigns being budget constrained, **: we might lose access to the inventory, advertisers could move budgets away. Might be able to regain inventory if EB is an option, or domains are available on AdX.</p> <p>Next Steps:</p> <ul style="list-style-type: none"> investigate high impression loss reasons (inconsistent bidding, pub config, whether these are good imps. at all) consider applying more nuanced strategies than simply not bidding (eg. first pricing defenses, distinguish incremental from duplicate) 	
	<p>Insights:</p> <ul style="list-style-type: none"> Completely stopping to buy on HB domains goes beyond protecting advertisers, might even lead to advertisers shifting budgets, in conflict w/ buy-side principle as we understand them: <ol style="list-style-type: none"> 1. Protect advertisers against bad auctions (in progress) 2. If an impression can be sourced through AdX at same or better value, buy it there <p>Detection that satisfies 2 is a hard problem.</p> <ul style="list-style-type: none"> It is unclear if this behavior would suffice to discourage HB. Accelerating buy side protections (bad auction defenses) & talking about it, could indirectly have more impact on HB, as it would increase pressure on other buyers to follow; could move whole market rather than just DBM/GDN.

Tobias

<https://docs.google.com/document/d/1XryiuPTTrpPSDFfQ6TP90DfSCAOay9Z68UxOrvMLibXM/edit>

Potential reasons: ADX floors at a different price, EDA price driven up by impression goals, incorrectly configured HB line item prices, inconsistent DBM bidding across exchanges, LI targeting only HB exchanges, inventory not real to begin with - eg toolbar and arbitrage

These two publishers always use DFP, so DFP sees every query

These two publishers always use DFP, so DFP sees every query

Insights:

- Even though these publishers each have only 4-6 authorized exchanges/headers, DBM sees 21 exchanges with their inventory
- DBM sees up to 20x more queries than DFP avails across HB, Fraud, and exchange systems for handling flex units
- About.com video: 30mm/month imps to AdX exclusively, but DBM sees: ~493mm/month in 2 non AdX exchanges
- [NYT](#) Header Bidders matched queries are 75% of AdX matched queries

Data underscores importance of work buy-side already has underway to be more aggressive with buying strategies and fraud. It also underscores need to understand why experiment shows such a big hit to revenue and impressions.

Sam

What can we do to help solve the "buy HB" problem?

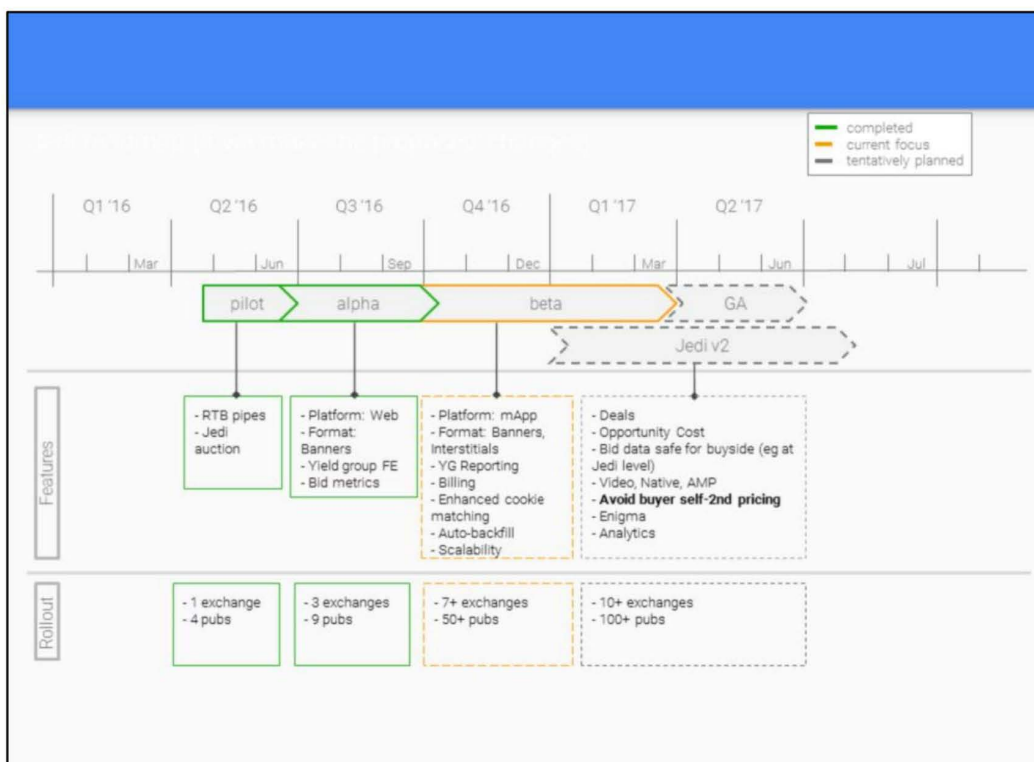
TAG PaymentID appears not to be a good solution to the "buy HB" problem -- [analysis](#)

- Only useful if "don't buy header bidding at all" is the right answer, this is inconsistent with experiment results right now
- After analysis, we realized that this is gameable in some important ways:
 - HB may not call us at all and just predict our price
 - Our PaymentID could be stripped out by a bad player to claim to be origin

Jim



Deepti/Tobias



Jim

<p>Based on experiment, not buying top 300 LPS HB inventory cross exchange (pubs account for 20% of DBM overall spend):</p> <ul style="list-style-type: none"> • -34% revenue (on 300 pubs, -6% overall) - -- some of the revenue may be recovered due to 80% of DBM being budget constrained • -30% impressions --- is the real issue as we might lose access to the inventory, as a result, advertisers could move budgets away. Might be able to regain inventory if EB is an option, or domains are available on AdX 	<p>Do we still agree on buyside principles:</p> <ul style="list-style-type: none"> • Protect our advertisers <ul style="list-style-type: none"> ◦ Invest in buy-side optimizations to protect advertisers against bad auctions (in progress) • All else being equal, we buy on AdX <ul style="list-style-type: none"> ◦ For cross-exchange, try and distinguish "incremental" from "duplicate" HB impressions and bid accordingly <p>Next Steps:</p> <ul style="list-style-type: none"> • Investigate high impression loss reasons (pub config, inconsistent bidding, whether these are good impressions at all) • consider applying more nuanced strategies than simply not bidding (eg. first pricing defenses, distinguish incremental from duplicate)

Potential reasons: ADX floors at a different price, EDA price driven up by impression goals, incorrectly configured HB line item prices, inconsistent DBM bidding across exchanges, LI targeting only HB exchanges, inventory not real to begin with - eg toolbar and arbitrage

Margin (AdX, GDN)	Google Revenue	Google Profit	Publisher Payout
Recommendation			
Current	0	0	0
15%, 20%	-1.6%	-8.2%	0.7%
10%, 25%	-3.1%	-16%	1.4%
5%, 28%	-4.5%	-24%	2.1%
0%, 32%	-4.9%	-29%	2.5%
10%, 20%	-3.3%	-25%	4.2%
5%, 20%	-5%	-41%	7.8%
0%, 20%	-5.9%	-55%	11%

Results in table are purely based on simulation.

[more details](#) [full model](#)

Sales feedback on impact of cutting rev share:

- Would not help win new business in head-to-head competition
- Would not help open new inventory on existing DRX pubs in existing market
- Discounts are being applied for top pubs today, not seeing significant margin erosion
 - OA avg rev share is 19.3%, down from 19.8% 5 years ago
 - Total AdX blended avg (OA, PA, PD, PG) is 18.8%

Recommended next steps:

- No change to standard sell side margins, continuing offering discounts as needed to win business.
- Study *increasing* EB revshare.
- Consider still going to 15%/20% to make AdX more competitive

Things not modeled well here:

1) What is inventory access increase

2) what is increased ROI from DBM / 3p buyers and does this result in more spend.

3) how much do we make up from new buy/sell opt changes

Open Auctions, Deals, and Transparency Initiatives

Nov 10th
assessment

1	EB++	<ul style="list-style-type: none"> - More features for Jedi product with major eng investment. - Make it better than HB. - Give up revenue with last look. 	
2	Open Jedi	<ul style="list-style-type: none"> - Allow networks (eg. Criteo, GDN) on Jedi - Give small SSPs access to all of DFP without pub contract - Buyer direct billing 	✗
3	Lower AdX revshare	<ul style="list-style-type: none"> - Reduce open auction revshare from 15-20% to 9-14% 	
4	Accelerate Deals	<ul style="list-style-type: none"> - Anything possible with DFP tags should be possible with programmatic buyers (PG and PNG, Guarantees with buyer decisioning) 	✓
5	Full bid landscape	<ul style="list-style-type: none"> - Share all bid data with publishers including GDN, DBM, and AdX buyers 	
6	Prevent self flooring / TAG	<ul style="list-style-type: none"> - Implement OriginId via TAG and publicize - DBM and AwBid do not buy ANY HB queries, only buy from origin servers (in effect prefers AdX on DFP sourced queries) 	✗
7	DBM Payout transparency	<ul style="list-style-type: none"> - DBM leads industry push to disclose what buyers are paying SSPs to publishers, so they can see what the true revenue share is - Add DBM/AwBid payout reporting to DRX on DBM spend 	

							NOTE: Sales estimate (8%) and payout (11%) is only a placeholder based on prior placeholder data and will likely change.
Margin (AdX, GDN)	Total revenue	change	Total payout	change	Total profit	change	
Current	\$129,502		\$96,232		\$33,270		
15%, 20%	\$127,410	-2%	\$96,863	1%	\$30,547	-8%	
10%, 25%	\$125,479	-3%	\$97,534	1%	\$27,945	-16%	
10%, 20%	\$125,242	-3%	\$100,256	4%	\$24,985	-25%	
5%, 28%	\$123,697	-4%	\$98,265	2%	\$25,431	-24%	
5%, 20%	\$123,176	-5%	\$103,652	8%	\$19,524	-41%	
0%, 32%	\$122,069	-6%	\$99,082	3%	\$22,987	-31%	
0%, 20%	\$121,215	-6%	\$107,044	11%	\$14,172	-57%	

Results in table are purely based on simulation.

[more details](#) [full model](#)

Things not modeled well here:

1) What is inventory access increase

2) what is increased ROI from DBM / 3p buyers and does this result in more spend.

3) how much do we make up from new buy/sell opt changes

Can we stop buying from other exchanges on header bidding domains?

Can we just stop buying from other exchanges on header bidding domains?

Answer: Possibly not based on experiment results

- **Experiment:** For top 200 LPS publishers who do header bidding, .1% experiment stopped cross-exchange bidding and found -30% revenue on that publisher subset (-3% impact overall if we only treat these pubs). Consistent across geo and domain.
- **Potential reasons:** ADX floors at a different price, EDA price driven up by impression goals, incorrectly configured HB line item prices, inconsistent DBM bidding across exchanges.
- **Caveats:** Effect might be smaller because of budget constraints (in fact, since 80% budget constrained will get most back), but also advertisers may move spend due to reach concerns making effect larger. Also doesn't take into effect buying through other exchanges in EB which would help if ADX floor or inconsistent bidding is reason.
- **Next Steps:** Further analysis to understand which of the reasons

Based on experiment on 300 HB pubs, not buying their inventory cross exchange (pubs account for 20% of DBM overall spend):

- -34% revenue (on 300 pubs, -6% overall) --- 80% of the lost spend is budget constrained, so we expect to recover most of the revenue
- **-30% impressions** --- is the real issue as we'd effectively lose access to the inventory on these specific domains, as a result, **advertisers could move budgets away**, might be able to regain inventory if EB is an option

[HB analysis](#), [Budget Constraint DBM](#)

- Buy side agrees on and already has OKRs against better buying strategies (prevent self competition)
- BUT we don't want to jeopardize adjustments in buying that will get pubs to shift inventory to where we can more effectively buy long-term.

Next Steps:

- Investigate high impression loss reasons (pub config, inconsistent bidding, whether these are good impressions at all)
- consider applying more nuanced strategies than simply not bidding (eg. first pricing defenses)

Potential reasons: ADX floors at a different price, EDA price driven up by impression goals, incorrectly configured HB line item prices, inconsistent DBM bidding across exchanges, LI targeting only HB exchanges, inventory not real to begin with - eg toolbar and arbitrage

300 pubs includes 131 OPG, rest LPS

Options from Oct 27th

- 1) Make exchange bidding more competitive versus HB
- 2) Compete more aggressively with other exchanges (DRX and Buyside changes)

November 10th, 2016

How will we build the new ad platform? (EB++ vs. Open Jedi)

	1. EB++ (More Features faster)	2. Open Jedi (Different biz model)
Description	<ul style="list-style-type: none"> - PG & PNG support to address Type 3 HB - Creative verification enhancements - Pub controls (Floors & Rules) - AdX gives up last look 	<ul style="list-style-type: none"> - Allow SSPs to buy without a pub contract with Jedi fees - Allow buyers (FB, AMZN, Criteo, GDN, etc) into Jedi directly - Allow buyer direct billing
Pros	<ul style="list-style-type: none"> - Better than HB, seen as fairer (last look) - Strengthen DFP "must call" status with BI 	<ul style="list-style-type: none"> - Seen as most open by exchanges, increases demand we aggregate
Cons	<ul style="list-style-type: none"> - Major investment - Still not seen as fair & open - Won't win FAN/Amazon - Loss of revenue (last look) 	<ul style="list-style-type: none"> - Huge investment - Won't win FAN/Amazon - Loss of margin - ADX collapses - Props up exchanges (they get all DFP inventory)
Next steps if we do it	Develop resourcing plan and timeline from Q1+	Develop resourcing plan and timeline from Q1+

NOT Recommended

NOT Recommended

Recommendation: do neither, just continue developing existing EB roadmap

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	3. Lower AdX revshare	4. Accelerate Deals	5. Full bid landscape
Description	Reduce open auction revshare from 15-20% to 9-14% - lower rates for high CPM (eg DFL)	Anything possible with DFP tags should be possible with programmatic buyers (PG and PNG) Buyer's choice	Share all bid data with publishers including GDN, DBM, and AdX buyers
Pros	- Price-competitive with other exchanges - Reduces financial benefit of HB and AdX/Jedi gap	- Make "DSP-into-DFP" superior to "DSP-to-SSP-to-HB-to-DFP" - Convert tag deals to revshare	- Market parity with every other exchange (who offer no-opt outs) - Returns trust in AdX
Cons	- DBM probably can't raise rates to compensate - AdX buyers more competitive against Google	Pubs could hurt themselves and Google by doing bad deals (but they're doing this anyway with HB deals)	GDN could be gamed given bernanke Downstream negative impact
Next steps if we do it	Build a financial model with intent to change price in Q1	Eng plan to accelerate PG GA and PNG Beta+GA	Experiment in Q4 with goal to roll out in 1H 2017
	Recommended	Recommended	NOT Recommended
Recommendation: do #3 and #4, wait and see on #5			
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Support for the new OriginServer buying model		
	6. Prevent self-flooring	7. Payout transparency
Description	<ul style="list-style-type: none"> - Implement OriginId via TAG and publicize - DBM and AwBid do not buy ANY HB queries, only buy from origin servers (in effect prefers AdX on DFP sourced queries) - DBM and AwBid ask all exchanges to implement this 	<ul style="list-style-type: none"> - DBM leads industry push to disclose what buyers are paying SSPs to publishers, so they can see what the true revenue share is - Add DBM/AwBid payout reporting to DRX on DBM spend
Pros	<ul style="list-style-type: none"> - Avoids risk of DBM or AwBid self-flooring - Stops subsidizing other exchanges' HB - Reduces QPS explosion on buyers 	<ul style="list-style-type: none"> - Exposes hidden buy-side fees, reduces financial incentive to run a bad auction, helps all buyers - Positive message to agencies & advertisers who want their money to go to working media - Could help expose domain fraud
Cons	<ul style="list-style-type: none"> - Could lose some access if detection has false positives 	<ul style="list-style-type: none"> - May require contract renegotiation with exchanges - Could lead to demand for more GDN transparency
Next steps if we do it	Sellside: implement OriginId ASAP Buyside: Implement bidding preference to Origin servers only	1. Ali & team follow up to see what is viable 2. Set a commercialization & PR plan, execute in 1H, probably at same time as price change if we do
	Recommended	Recommended
Recommendation: do #6 and #7		
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Asking for DBM to follow thru on the OriginServer buying regardless of ROI. on opt campaigns. Theoretical use case here of a buyer specifically asking for a fixed CPM on a specific exchange for OA buys - follow up to see if this is real

Radical options

Page 3 of 10 - Page 3 of 10 - DISCLOSURE

EVERYTHING HERE PENDING LEGAL REVIEW – DISCUSSION OF OPTIONS ONLY, NOT A PLAN TO ACT

Redacted - Privilege

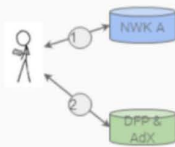
EVERYTHING HERE PENDING LEGAL REVIEW – DISCUSSION OF OPTIONS ONLY, NOT A PLAN TO ACT

Redacted - Privilege

Header infra types and threat

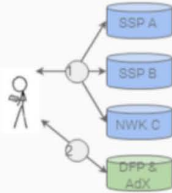
How to connect to the ad ecosystem: Client-side vs. Server-side

Basic header bidding



Pro: simple to work with one partner
 Con: separate code per SSP, latency, passbacks

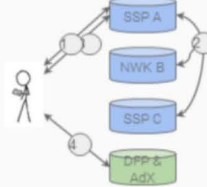
Client-side wrapper



Pro: easily add several SSPs, open source
 Con: heavy on the client, latency

3P Exchange bidding

aka "server side wrapper"



Pro: add demand partners without latency, log all events
 Con: cookie matching

- Amazon is launching exchange bidding starting with 1c serving fee, no revshare, direct billing & no rules
- Facebook has agreed to at least buy through client-side wrappers

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are 12-14 wrappers in the market, and we will have 2-3 wrappers for DFP

With server-side wrappers, we lose control over inventory access and ad selection. For example:

1. Facebook demand is already "must have" for publishers, FB wants inventory access and is building HB infrastructure
2. Publishers add FB Header infrastructure to their pages - it just adds yield
3. FB tags spread, allowing FB to develop the functionality/infrastructure to take control of ad selection and develop it into a DFP replacement

Possible "end game": steady state where there are 2-3 "must-call" server side "wrappers" like Jedi++. We need to remain one of them.

- Amazon wrapper already in the works
- The more demand we have, the better chance we have to be one of those 2-3.

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				Back to EB options	less value than HB
				all details	similar value as HB
					better value than HB
	Header Bidding	EB++ / Open Jedi feature options	Pubs	Exchange	DSP
(1) Deals	- PMPs given same or better priority than AdX - SSPs make all current transactions programmatic with opp cost to help inform the seller of cost of the deal	(1a) parity between AdX & Jedi PA/PD (1b) allow AdX and Jedi buyers to recreate current deal types/goals (note: need 5a before we will allow 1b)*			
(2) Demand Sources	- any SSP or network can build support - buyer gets own cookie and privacy sensitive data on 100% of calls for client-side HB	(2a) encourage top networks to join ADX at favorable terms, keeping GDN on equal footing. (2b) "trial mode" for SSPs on AdX (2c) cookie match optimization/match all DFP impressions			
(3) Transparency / Fairness	- pub gets all bids & bid times via analytics - buyers can opt-out of bid transparency - AdX gets "last look"	(3a) stop letting AdX/GDN/DBM opt-out of bid data sharing (3b) expose bids from Jedi & AdX to pubs in DFP UI & DT (3c) stop giving AdX last look (in Jedi only)			
(4) Configurability	- configurable floors and blocks/rules per SSP, but pub must work with each SSP separately (highly fragmented) - many SSPs allow some level of demand to transact before verification	(4a) configurable floors per SSP (DFP enforces/UI) (4b) configurable blocks/rules per SSP (DFP enforces/UI) (4c) allow limited serving before verification (up to N per creative) and protection for everything (4d) support all formats			
(5) Business Intelligence	- SSPs offer limited analytics and integrations with GA - nobody shows opportunity cost of everything	(5a) show opportunity cost of line items & deals (5b) show opportunity cost of latency			
DRX roadmap will be affected to build all of the above: new big projects or lower priority (eg. s2s, ad blocker thwarting, mediation).					
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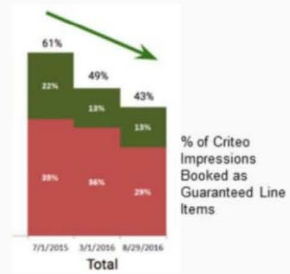
4c: doing malware checks but then allowing limited serving before categorization.

Appendix A: Header infra data for 3 types

DFL intended to improve on Type 1 Header infrastructure

Observed change in Criteo presence, A9/FB still threats

- Criteo change Q1 to Q3 :
 - HB impressions **-16%**
 - Networks using Criteo HB tags **+19%**
 - % of DFL revenue from 6.2% to 18.5%
- ~40% of Criteo HB imps are in guaranteed space globally, but declining
 - 70% in EMEA



	7/1/2015	3/1/2016	8/29/2016	13 month change
Criteo HB as % of Total DFP Impressions	0.92%	0.83%	0.7%	-23%
AdX as % of Total DFP Impressions	22%	22%	21%	-5%
DFL as % of Total DFP Impressions	0.29%	0.26%	0.2%	-31%

Source: DFP data, Global LPS partners

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AdX impact

steal: HB/Jedi wins impression AdX would have won

price pressure: HB/Jedi 2nd prices AdX

steal : price pressure ratio

- HB: 1.5:1
- non-HB remnant: 1.82:1
- Jedi: 1.16:1

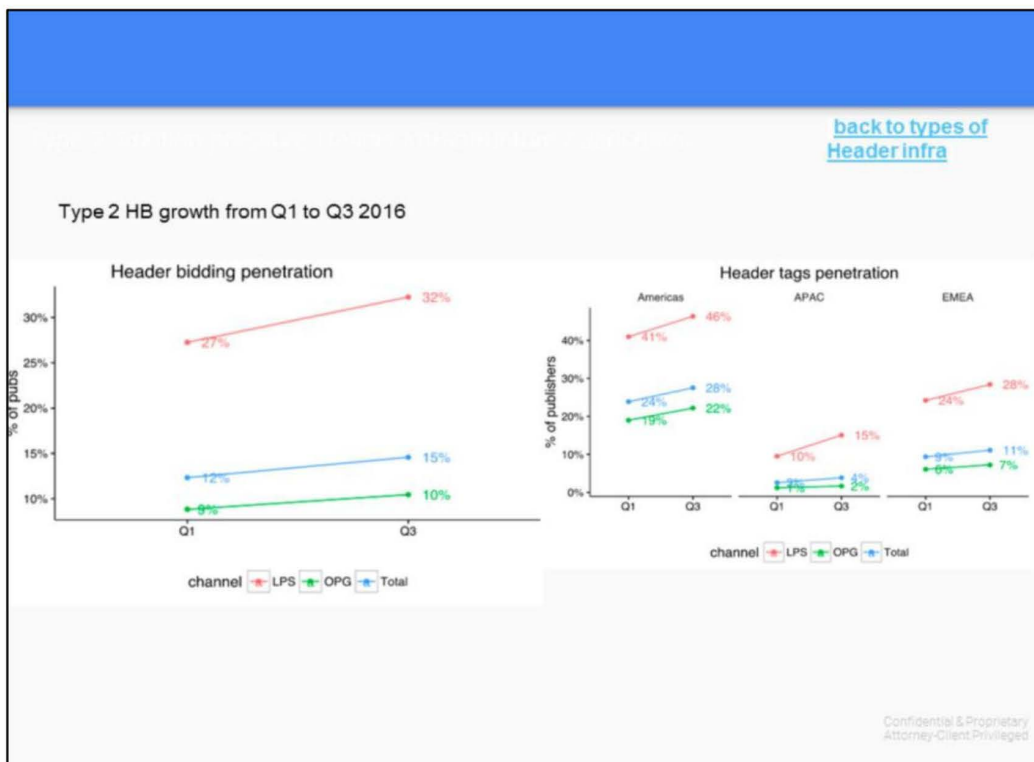
→ Jedi looks better for AdX than HB or average price remnant LIs

Pub revenue lift

- HB: 8-20% ([50%](#) from media reports)
- Jedi: 3-8%

→ HB performs better than Jedi from pub perspective in Alpha, but on *very limited experimental data with a very small number of exchanges participating in Jedi vs HB*

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used for the detection:

Bucketing: similar enough line items with different rates

KeyValues: looking at known HB keyvalues + when the rate is appearing in the values of KeyValues

The difference with LPS AMS was coming from different things. The main one was that I was looking at DFP accounts whereas the publisher team was looking at publisher parents.

The gap is now much much narrower, ~46% penetration for LPS AMS.

What are our top priorities?

Top priority:

- Keep Access by Slowing Header Bidding Growth

Secondary:

- Slow ADX cannibalization by HB and EB

Why that order?

- Access is the most important for Google.
- If we have to go anywhere, we would rather go from 20->5 than 20->0.

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Jim

Options/Trade-offs

Issue: Do we need to require a publisher and exchange to have a contract with each other?

Considerations/risks:

- We could be at disadvantage if other exchanges don't have to follow blocks/rules.
- We could cannibalize ADX and help other exchanges grow.

Options:	No Contract Required	Publisher declares contract	Publisher and exchange declare contract	Require contract is shared
Friction	None	Low	Low-Medium	High
Risk: ADX loss to exchanges	Pubs may have different/no rules/blocks	Less likely rules/blocks missing	Even Less likely rules/blocks missing	Unlikely EB will be used much
Risk: ADX loss to HB	EB likely to be used/preferred	EB pretty likely to be used/preferred	EB pretty likely to be used/preferred	Unlikely EB used
Service cost	Creatives, troubleshooting	Medium when pub lies (creatives, etc)	Less likely both lie	Get/review contract

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<p>Issue: How much do we encourage publishers to join EB?</p> <p>Considerations/Risks:</p> <ul style="list-style-type: none"> We could unnecessarily cannibalize ADX AMZN & prebid will gain more traction if we're too slow 						
Options:	No matchmaking	If pub on HB w/ any EB SSP, only matchmake for that EB SSP	If pub on HB w/ any EB SSP, matchmake for all EB SSPs	If pub on HB w/ any EB SSP or prebid or AMZN, matchmake for all EB SSPs	If pub on HB w/ any provider, matchmake for all EB SSPs	Matchmake all pubs, even if not currently using or planning HB
Risk: ADX loss to exchanges	Minimize cannibalization	Minimize cannibalization	Some cannibalization	Some cannibalization	More cannibalization	Most cannibalization
Risk: EB loses to HB	AMZN & prebid grow faster	SSPs resist this strongly	Not enough to win against AMZN	Target our key competitors	Onboard almost everyone quickly	Onboard everyone quickly
Pub yield	No gain vs today	No gain vs today	Some gain	Some gain	Lots of gain	Lots of gain
Service cost	EB stays small	EB stays small	More pubs	More pubs	EB really big	EB really big
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Issue: Should we share floors per query with exchanges?

Considerations/Risks:

- Exchange may learn about reservation volume and pacing.
- Exchange may learn about pricing.

Options:	No floor shared	Share publisher specified EB floor	Share only 3p reserve	Share same floor that is sent to AdX buyers
Risk: ADX loss to exchanges	No incremental loss vs today	AdX loses more if EB floor is lower	AdX loses more	AdX loses even more
Risk: EB loses to HB	No data benefit from EB	EB preferred over HB	EB preferred over HB	EB even more preferred over HB
Pub yield	Exchange less likely to bid above 3p reserve	Exchange more likely to bid above floor price	Exchange more likely to bid above 3p reserve	Exchange more likely to bid above AdX buyers
Service cost	Pub & exchange both more likely to ask about win rates	Pub gets control but exchange likely to still ask about win rates	Fewer escalations about win rates	Fewer escalations about win rates

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What should we do?

Issue: What should we do about bid landscapes?

Considerations/Risks:

- Publishers want bid landscapes for yield management and to make direct deals.
- GDN and other buyers don't want to be gamed by yield management services.

Options → Risks ↓	No landscapes	Jedi auction landscapes only including overall ADX bid (current plan)	Jedi + Opted-in buyer AdX landscapes (event level, new plan)	Jedi + all buyer AdX landscapes (event level)
Friction for growing EB	Some very unhappy with this. Constant objections from pubs and exchanges on "transparency"	Not as good as full landscape - pubs conflate Jedi and AdX bid sharing as Google "transparency".	- Better sell side story - "if you can convince buyer, you'll see everything" - Little incentive for AdX buyers to agree	- Little incentive for AdX buyers to agree - Some buyers very against it (eg. GDN)
Lose pubs to other s2s EB	Amzn offering	Amzn offering	Amzn offering.	Parity with Amzn.
AdX loss to exchanges	Other exchanges preferred. bid data allows deal making etc.	Other exchanges preferred. bid data allows deal making etc.	Other exchanges preferred, but 3p tools like Adomik work	Parity with other exchanges in bid data.
AdX loss to HB	All HB offers unified auction bid transparency	Parity with HB, but seen as not fully transparent	Parity with HB, transparency story better.	Parity with other EB, HB and exchanges.
Yield	Neutral	Possible increase if exchanges bid more	Possible increase if exchanges bid more	GDN/other change bidding

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Should we allow direct billing for other exchanges?

Issue: Should we allow direct billing for other exchanges?

Considerations/Risks:

- Fraud (eg, we don't see or get paid for all transactions, and the price paid may not be the closing price)

Options:	Google Billing	Direct Billing
Friction	High for exchanges	Lower for exchanges
Risk: ADX loss to exchanges	Neutral	High because of fraud
Risk: ADX loss to HB	May make some exchanges not want EB	Fraud risks
Service cost	No audit cost	Audit costs

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Issue: Should we give up last look?

Considerations/Risks:

- Last look considered not fair by exchanges and publishers.
- Giving up last look can cause ADX to win less frequently.

Options:	Give up last look	Give up last look and allow Jedi bid	Keep last look
Friction	Big exchange/pub objection gone	More complex for ADX buyers	Big objection even if value isn't much
Risk: ADX loss to exchanges	Have to work harder with RPO	Buyers can help set price	ADX just needs a high bid
Risk: ADX loss to HB	Exchanges/pubs more likely to choose EB	Exchanges/pubs more likely to choose EB	Exchanges more likely to keep pushing HB
Service cost	More EB onboarding	Explaining to buyers	Fighting HB set-ups
Revenue	Hit of ~5% so far	Less of a hit b/c ADX wins more	ADX wins more, but EB used less

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slide graveyard

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