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Background:

This paper explores the the topic of how Google demand sources (GDN, DBM) should respond to the growing trend where publishers manage multiple demand sources via a 'header tag' implementation. In this paper we cover:

Executive Summary

Header Bidding Overview

Google's Observations and Responses
- Sell-Side
- Buy-Side

Google Header Bidding Options
- GDN, DBM or GDN+DBM Header Bidding Offering
- AdX header bidding offering

Recommendation

Executive Summary:

There is an opportunity to evolve our DRX relationships with publishers through header bidding. The full DRX stack is our gold standard but we can improve on the AdX only offering by implementing DRX Indirect demand via header tags. This would mean bringing demand from our open auction, Exchange Bidding and potentially DFP First Look (DFL) to pubs outside of DFP with the ability to submit prices on a per impression basis. This could help us position ourselves against Facebook and Amazon as they expand their publisher monetization efforts.

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Header Bidding Overview:

Historically ad servers did not consider CPMs from networks, DSPs or exchanges in real-time. These indirect demand sources were booked in ad servers with CPMs based on historical averages. Dynamic Allocation[1] between DFP and AdX changed that by allowing demand from AdX to compete with DFP line items in real-time. This led to significant yield improvements to pubs. Overtime, other demand sources did not feel it was fair that AdX was given unique treatment in DFP. This led networks and subsequently exchanges to develop the the ability to submit near real-time prices to DFP (and other ad servers) to inform ad serving logic via the technology called header bidding. This has also led to significant yield improvements for pubs.

Header bidding began several years ago as a clever mechanism for remarketers (primarily Criteo) to maximize access to inventory/cookies and buy selectively without hindering a publisher's ability to deliver directly sold campaigns. Today, header bidding continues to grow in popularity (~50% penetration) as a buying strategy for the largest publishers in the industry to source demand from networks, exchanges and increasingly so by DSPs/trading desks. Of particular interest and concern is that both Amazon and Facebook see header bidding as an effective way to deliver their unique demand to publishers. We are seeing 3 common reasons pubs implement header bidding:

- Give high-CPM demand (e.g. remarketing) an early look at impressions
- Put exchanges in competition with each other with accurate per impression pricing
- Enable programmatic deals

Some pubs may integrate DSPs and networks via header tags for the sole purpose of avoiding the revenue share fee charged by exchanges (20% for the AdX).

Comment [1]: Game 2nd price auction logic by having the same buyers competing against themselves through different SSP

While the technology has become more sophisticated over time, it still requires at least one extra tag on the page. The additional client-side request(s) along with other server-side technology adds latency for both publishers and users. Other problems exist throughout the end-to-end process (e.g. creative controls, pricing & billing transparency) but publishers have been willing to put up with such issues in return for greater revenue. Many of these problems are exacerbated on the mobile web and technologies such as AMP, meant to clean up the mobile web, make it significantly more difficult to implement header bidding.

[1] Dynamic Allocation allows AdX to bid and win against ads booked in DFP. Opportunity cost CPMs are calculated for directly sold ads and line items CPMs entered by the pub are used for indirectly sold. Opportunity cost CPMs, line item CPMs and AdX CPMs are compared to determine which ad servers to maximize pub revenue. CPMs for directly sold ads are calculated on an impression-by-impression basis to prevent under delivery.

On the buy-side, header bidding poses a different set of issues. When multiple exchanges are called for a single ad slot, buyers wind up bidding multiple times resulting in self-competition. The increase in queries per second (QPS) for both networks and DSPs add to machine costs. These problem gets worse when header bidding providers sub-syndicated impressions to other unauthorized SSPs that take a cut and reduce the share of an advertiser's dollar that makes it to the publisher. Beyond the pure machine costs and additional revenue shares or tech fees, engineering resources are needed to develop intelligent bid filtering and decision logic.

Google's Observations and Responses:

Sell-Side

Google has evolved from being a vocal detractor of header bidding to developing superior alternatives. Google has launched and will continue to launch products within DRX that solve the key publisher and buyer needs that led to the rise of header bidding:

- DFP First Look (DFL) allows any AdX buyer to access the majority of, if not all, DFP inventory at a pub determined price floor.
- Exchange bidding allows 3rd party exchanges to buy via RTB and take advantage of Dynamic Allocation.
- Programmatic deals allows AdX DSP and Network partners to engage directly with pubs via DFP rather than through header tags.

While these products have been successful or are at least promising in their early stages of development, it is unlikely that header bidding will be eradicated as the result of these Google offerings. DFL may provide a good insight of the future of header tags. Following the launch of DFL, impressions from Criteo and Amazon header bidding implementations went down a significant amount but the number of header bidding relationships between those buyers (particularly Criteo) and publishers went up. Both Amazon and Criteo are participants in DFL that have recognized the benefit of the product, however both companies clearly value direct relationships with pubs. By maintaining a tag on a pub's pages companies retain the opportunity to develop new and interesting ways of prioritizing their access to inventory and helping pubs maximize revenue. It would not be surprising if a similar trend emerged as we evaluate the impact of Exchange Bidding on dynamics between exchanges and publishers. For the majority of Google's exchange and network competitors products should provide a compelling alternative for inventory available through DFP. Facebook and Amazon, however, are current targeting access to publisher inventory through header bidding wrappers. Despite Google's best efforts there will always be addressable inventory outside of DRX and many networks and exchanges will continue to launch, maintain, and iterate on header bidding technologies.

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Buy-Side

Today Google demand buys via many different channels to support a platform agnostic approach proving to advertisers their spend is able to reach the broadest pool of inventory possible. Google benefits most financially when buying on AdX; therefore both GDN and DBM have eng resources dedicated to buying more intelligently when mediation and/or header bidding is detected favoring AdX when possible.

TABLE: Current Buying Channels:

Method of Accessing Inventory*	**AdX via DFP:** Dynamic Allocation	**AdX via 3rd Party Ad Server:** Avg Price Line Item	**3rd Party Exchange via DFP:** Exchange Bidding	**3rd Party Exchange via Ad Server:** Avg Price Line Item	**3rd Party Exchange via Ad Server:** Header Bidding	**API Access** to Large Pub / Walled Garden (e.g. Twitter)
Google Buy-Side Terms	GDN: 15% DBM: 10%**	GDN: 15% DBM: 10%	GDN: 32% DBM: 10%	GDN: 15-32% DBM: 10%	GDN: 15-32% DBM: 10%	DBM: 10%
Google Sell-Side Terms	AdX: 20%	AdX: 20%	EB: 5%	N/A	N/A	N/A
3rd Party Terms	N/A	N/A	Exchange: 0-20%	Exchange: 0-20%	Exchange: 0-20%	N/A
Pros	• **Own decision logic** - last look against backfill enabled line items • **Sell-side rev share**	• **Sell-side rev share**	• **Own decision logic** • **Sell-side rev share**	• Platform agnostic selling point • Ensure **maximum access to inventory**	• Platform agnostic selling point • Ensure **maximum access to inventory**	• Access to otherwise inaccessible inventory
Cons	• Avg price line items can win and deliver lower CPMs • Do not always have same access as other indirect sources	• Don't own decision logic • No per impressions pricing - growing disadvantage compared to HB exchanges	• Early stage product • Lower sell-side rev share	• **Don't own decision logic (on 3rd Party)** • **No per impression pricing**: disadvantage compared to HB exchanges • Often **bidding on inventory also seen by AdX**	• **Don't own decision logic** • Often **bidding on inventory also seen by AdX** • No sell-side rev share on 3rd party ad servers	• Don't own decision logic • No sell-side rev share on 3rd party ad servers • Does not currently include GDN

Comment [2]: Might want to clarify what method correspond to Awbid vs Adwords vs DBM

Comment [3]: Where do you put DBM on YT?

- No sell-side rev share on 3rd party ad servers

* Intentionally left out AdSense and AdMob pools of inventory for the purpose of this evaluation.
** 10% used throughout this paper as the average DBM % fee charged to partners

Buying via 3rd party exchanges means greater reliance on third party technology vendors and sacrificing margin (especially with DBM fixed platform terms). Meanwhile our largest buy-side competitors are going directly to publishers simplifying the path to inventory, thereby eliminating ad technology middleware costs and maintaining margin flexibility due to their own network business terms. We have seen AdX buy-side partners such as Criteo and AppNexus reduce or eliminate spend on AdX when a direct header bidding relationship with a pub is present. We expect Amazon to follow suit. Our largest competitor in the advertising space, Facebook, can leverage header bidding to avoid exchanges all together. While Google/Doubleclick has spent the last 20 years establishing ad server and monetization relationships with publishers, Facebook is now able to approach pubs with unique demand and free ride on top of our ad serving technology to deliver user-based per impressions prices across all of a publisher's inventory[2].

Comment [4]: Criteo RTA tag was the first large scale HB tag but with mostly fixed price. Rumor on their plan to move to "real" HB (dynamic price)

Comment [5]: FB is not using any exchange to source inventory. The key question for them is how to best expose their demand so they get the first look to inventory. Should they move from a static network tag (and expose real time bid to another decision engine)? Provide a mediation layer (and part of it with a wrapper)? What do you mean "free ride on top of our adserving technology"? FB demand needs to be integrated into a decision engine. For Apps, it can be another mediation stack or Admob. For mweb, this is the adserver of the pubs and any impression is "paid" for (ie no free ride).

Google Header Bidding Options:

There was a time when header bidding appeared to be a fad that would run its course. This no longer is true. Amazon and Facebook have solidified the reputation of header bidding. Each has valuable enough demand that if they choose to withhold it from traditional monetization channels pubs would be compelled to work with these two large industry players on their terms. Today, that means header bidding. There is unrealized & credible threat from Amazon and/or Facebook could ultimately develop an alternative to today's traditional ad server displacing Google and/~~or~~ our present day ad server competitors as a publisher's primary monetization technology. Amazon has already announced that their strategy is to place their tag on pub pages thus establishing a foothold. Facebook has not stated their intention beyond buying through header bidding wrappers but a pub strategy is likely being developed.

We, as Google, must consider shifting industry dynamics to determine the best ways of buying and making inventory available in order to sustain our ad network and platform businesses. Exchange bidding offers a credible alternative to header bidding for pubs

[2] Side note to this paper, we should revisit DFP CPM costs on non-programmatic transactions. Ignoring for now that we charge CPM and rev shares on some impressions we should acknowledge that we want to be compensated for ad serving decision logic when it pertains to HB informed line items. If FB, Amazon, Criteo and the like are going to pursue a strategy of avoiding exchanges, DFP should be able to benefit from their presence somehow. If we decide to eliminate CPM fees (double charging) on PG/PNG impressions we could also drive adoption of programmatic features or reduce the gap between rev share and CPM by increasing ad serving CPMs.

that work with DFP, however it will not eradicate header bidding. We should make our position on header bidding explicitly known and determine whether we will be a participant.

Today both DBM and GDN implicitly support header bidding due to the fact they buy on exchanges that have developed their own header bidding technology. Google is helping to fund the expansion of header bidding while not participating in it directly.

TABLE: Options for how Google can respond to header bidding:

Option	Complete Rejection	Smart (Implicit) Acceptance	Build Google Solution
Description	**Fully change course (away):** GDN/DBM refuse to buy header bidding impressions or on exchanges that participate in header bidding - ***Not recommended based on how it limits access to inventory***	**Incremental Improvements:** GDN/DBM buy on exchanges that use header bidding but minimize risk of self-competition and favor AdX whenever possible - ***Status Quo, not addressed in this paper***	**Fully change course (towards):** Google builds a header bidding solution for pubs that do not work with DRX (DFP+AdX) capable of offering per impression pricing. ***What demand is available via this product is explored below.***
Pros	• Reduces self-competition • Could increase DRX/AdX adoption	• Keep (DBM) value prop of being inventory agnostic. • Increased AdX performance / revenue	*See Deep Dive and Chart below for deeper exploration of this option.*
Cons	• Loss of inventory and ability to spend • Might require pulling spend from exchanges completely	• Google continues to implicitly support header bidding without providing an alternative outside of DRX	

There are several way Google Demand sources can be made available via header bidding:

TABLE: Deep Dive on "Build Google Solution"

	1. GDN Only	2. DBM Only	3. GDN + DBM	4. AdX
Google Buy-	GDN: 15-32%	DBM: 10%	GDN: 15-32%	GDN: 15%

Comment [6]: why would we want to eradicate (a strong word by the way) HB? HB is making decision making more efficient as relying on real time bid vs average.

Comment [7]: We are allowing other exchanges to better represent our demand as when Adx/Adsense is included in a decision engine (Adserver) that is not DFP, we are not providing real time bid (that said this assumes there is no built in advantage of DBM buying on AdX). Are we trying to address the right question? Should it be : what is the best inventory sourcing strategy for DBM/GDN, beside "owning the tag", that would allow to maximize Advertiser, Publisher and Google benefits? Could HB represent an opportunity for Google

Comment [8]: I don't think we can "mix" GDN and DBM. GDN is our network and inventory sourcing strategy is our decision. DBM is a platform and user of the platform should be free to source the inventory they want. Why would Google do that? HB allows to better represent our demand.

Comment [9]: This inventory loss is not well understood. Early data showed big losses, but improved experiments are still in progress.

Comment [10]: Is the question: what demand sources should we include in a Google HB - Different stages; GDN, GDN+DBM through Adx, GDN+all RTB buyers on Adx and GDN+all buyers on Adx including EB? With the trend on wrappers, would it make sense to limit our demand? Can we afford to have an inferior offer vs other wrappers?

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Side Terms			DBM: 10%	DBM: 10%
Google Sell-Side Terms	N/A	N/A	N/A	AdX: 20%
3rd Party Terms	HB Wrapper/S2S charge?	HB Wrapper/S2S charge?	HB Wrapper/S2s charge?	N/A
Pros	• Can manage rev share given fees aren't transparent • Reduce need to buy on 3rd party exchanges and pass more value to pub • Direct to pub simplifies bidding • Potential increase in inventory access from pubs not using DRX	• Reduce need to buy on 3rd party exchanges and pass more value to pub • Direct to pub simplifies bidding • Potential increase in inventory access from pubs not using DRX	• Reduce need to buy on 3rd party exchanges • Direct to pub simplifies bidding • Potential increase in inventory access from pubs not using DRX	• Reduce need to buy on 3rd party exchanges (self competition and propping up 3rd party exchanges) • EB technology to compete with wrappers/Amazon • All GDN demand is always in play (as opposed to AWBid) • AdX buyer demand improves performance • Use existing GPT tag • Could more easily upsell DFP • Helps replace existing AdX tags • Cleaner sell-side story • Margin can remain consistent on and off DFP pubs
Cons	• Supports HB • Threatens AdX direct and sell-side rev share • Could complicate buying logic on DRX or AdX • Excludes DBM	• Supports HB • Inflexible rev share • Threatens AdX direct and sell-side rev share • Could complicate buying logic on DRX or AdX • Excludes GDN	• Supports HB • Threatens AdX direct and sell-side rev share • Could complicate buying logic on DRX or AdX • Margin inconsistency	• Supports HB • Could undermine DRX value prop since it offers much the indirect DRX functionality

Comment [11]: +tmaurer@google.com
This may not be the case if the pub imposes latency limits on the AdX header tag. Part of the reason AWBid is limited is latency.

Comment [12]: GPT tag would have to be modified to only retrieve bids from AdX?

Option A: GDN, DBM or GDN+DBM Direct Header Bidding Offering (1, 2 and 3 in chart above)

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A GDN/DBM header bidding product offering could be introduced to the market as a new and superior way of accessing Google demand for publishers. However If GDN/DBM were to introduce header bidding as an additional methodology to gain access to inventory (and began working directly with pubs) it could complicate things on many levels. There are several key points that need to be considered:

- **Direct integration:** Having tags on non-DFP pub pages will give GDN/DBM a greater ability to cookie match and buy effectively.
- **Option for pubs not sold on DRX:** Many publishers chose not to work with DFP and/or AdX yet still benefit from Google demand through other exchanges. A direct integration with pubs would allow Google demand to transact on these pubs' sites without relying on exchanges that do not have the same quality standards and/or SPAM detection capabilities.
- **Margin Implications**: . The prevailing technical cost of header bidding in the market today is nearly nothing. Buyer margins are extracted either through non-transparent buy-side fees (e.g. FAN, Criteo taking their share pre-bid) or exchange fees (SSP transparent revenue share). If Google enters the header bidding space with GDN and/or DBM we would need to decide whether we'd extract margin by supporting header bidding as an alternative to DRX (DFP+AdX or AdX only). We would also need to determine how we'd extract his margin. One option is to attempt to implement a header bidding sell-side revenue share to maintain Google margins. Absent a sell-side revenue share the current AdX terms would be seriously called into question. If a pub could work with GDN/DBM directly, the perception would be the 20% rev share charged by AdX could be avoided. GDN is able to manipulate its margin in a way that Google remained whole. DBM would have a much harder time this so given that rates are negotiated and defined in advertiser/agency contracts. While the 20% revenue share continues to be debated internally and potentially threatened by competitive maneuvers in the market, this approach would expedite the need to clarify and limit options on effectively manage margins.
- **Competition against existing products:** With a GDN/DBM header bidding product in the market we would have to be able to articulate when a pub could work with it. If we allow DFP pubs to work with GDN/DBM header bidding then the AdX revenue share issue mentioned in the "Margin Implications" bullet above needs to be addressed. We would be forced to prove the uplift derived from the DFP + AdX stack and its revenue share and have it compared against direct access to GDN/DBM via header bidding (assuming no HB rev share). The GDN/DBM header bidding would have to be implemented in a manner we are directly attempting to discourage via Exchange Bidding.
  If we allow AdX only pubs to work with GDN/DBM header bidding, again, the 20% rev share is an issue (assuming no HB rev share). Beyond compromising the AdX only business terms the AdX stand alone product would be disadvantaged since GDN/DBM would likely have a competitive advantage via header bidding. For non-DFP pubs, AdX is most likely represented

Comment [13]: I am not sure I follow you. HB are technology used by Network or SSP to access additional inventory. I am not sure considering DBM makes sense here. DBM does not access inventory directly, it goes through Adsense, Adx or another SSP. Appnexus is diverting its DSP demand to its HB SSP so that it does not pay our OA rev share and keep it for themselves (or offer a lower rev share to the pubs). Do we consider that a wrapper could start integrate directly with DSP (vs SSP)- becoming in fact a SSP and not charging anything? Does it make sense economically?

in the ad server as an average price whereas any header bidding implementation would be able to submit per impression prices[3]. As of 2016Q4 the AdX only business represented ~30% of AdX queries and 20% of AdX revenue.
Today GDN and DBM buy via multiple exchanges. If a GDN/DBM header bidding tag were present on a pub page we would have to determine whether GDN and DBM continue to buy via non-AdX exchanges on those pub pages? Implementing header bidding could make us less reliant on 3rd party exchanges for sourcing inventory and could clean up the bidding landscape.

- **Sales resourcing.** In addition to complexities described above it is unclear how we would go to market with a GDN/DBM header bidding product. The easiest solution would be to bring it to market as a sell-side product. In this case our PBS sales and gTech account teams would have to ramp up on the new GDN/DBM product. The existing DRX, AdX only relationships could be stressed if it's possible to gain access GDN/DBM demand without a sell-side fee.

In order for this direction to be viable the we need to develop a plan to extract sufficient margin from DBM transactions to account for cannibalization of current impressions flowing through DFP and AdX. A proper segmentation strategy would also need to be put in place.

Option B: Evolve AdX direct to be a direct header bidding offering (4 in chart above)

An AdX header bidding strategy could be positioned as an extension of the 'own the tag' strategy. Today, 'own the tag' means placing the Google Publisher Tag (GPT) on the page directly so Google owns the decision logic via DFP across all demand sources. With DFP Google than determines whether to serve a directly sold ad (programmatic or tag based) or an indirect ad, which could be sourced from AdX, an average priced line item, a header bidding informed line item, or exchange bidding.

If we rolled out an AdX header bidding product, we could leverage the GPT tag the majority of the DRX indirect functionality. This could accomplish several things.

- **AdX Only Competitiveness:** We could increase the AdX stand-alone product competitiveness. Today, with most other exchanges participating in header bidding, AdX only implementations are at a disadvantage. This product launch could help preserve AdX revenue (and Google margin) outside of DFP.
- **Match/Exceed Amazon's Offering:** We could match Amazon's ability to work with multiple exchanges on a server-to-server basis by leveraging Exchange Bidding. We could also investigate how to best include DFL in the AdX header bidding offering. Down the road, New Network efforts could compete the data offering Amazon is currently promoting.

[3] This is a problem AdX only implementations face today when competing against other exchanges implemented via header bidding. Our AdX only business is threatened by this fact.

- **Deprecate AdX tags:** It's known that AdX only pubs will have to re-tag at some point in the future. This could encourage that pub behavior.
- **Easier DFP Upsells:** Having the GPT on the page could make moving from a competitive ad server to DFP a less technically complicated task for pubs (not sure if this is true due to the fact the GPT would be in the header).
- **Margin Consistency:** Expanding AdX functionality would make it easier to manage margins. Initial thoughts are AdX and Exchange Bidding rev shares via a header tag should be the same as the DRX product. This could be seen as an incentive to use DRX where you get more functionality/interoperability across both direct and indirect pools of demand for no additional costs. As acknowledged above, charging a revenue share for a header bidding implementation could be difficult to back up in the market. While the AdX rev share, at 20%, might still be considered high in the market, all exchanges participating in header bidding take a sell-side cut of revenue. Currently no one appears to be charging for the wrapper or server-to-server functionality, making a 5% Exchange Bidding fee potentially controversial. All rev shares should be considered within a larger sell-side strategic pricing review spanning our traditional implementations as well as any header bidding implementation if next steps are deemed logical.

Two downsides to evolving AdX direct to be a direct header bidding offering include potential cannibalization of our DRX stack and contradicting other products Google supports in the current market. By providing so much DRX indirect functionality within a header bidding implementation pubs could be more willing to abandon our traditional DFP services inclusive our Programmatic Direct capabilities. Google fully supports the AMP open standard, which today does not allow header bidding (opportunity to create superior AMP opportunity). Supporting header bidding for one product while discouraging it via Exchange Bidding could also confuse Google's message in the market.

Comment [14]: Our "direct" adserving stack should be able to compete by itself. EB is not discouraging HB. This is a clever way to integrate several SSP (native s2s). So I don't see any confusion. The issue we need to solve is AMP as we need to make sure we don't limit ourselves in our access to inventory

Comment [15]: Another way at looking at this would to identify the pubs "type": adsense only, adsense+other networks, another adserver+adsense, another adserver+Adx, another adserver+another SSP, another adserver+another SSP+another network tag, another adervser+another SSP+HB/Wrapper. Try to size each segment (pub/impressions), evaluate the revenues we make with each segment, evaluate the potential upside to move to a HB. Source of upside: real time bidding (better representation of our demand) and ability to redirect GDN/DBM demand toward our HB.

Comment [16]: I would also like us to explore 3 additional dimensions: 1/ could a wrapper play allow us to introduce some decision logic for pubs using statically different network tags and 2/ accelerate the move from mediation technology toward and 3/ take a pure Apps angle and see what make sense.

Recommendation:

Research the feasibility of a three pronged approach to accessing publisher inventory:

1. DRX full stack
2. DRX Indirect header bidding integration
3. GDN/DBM header bidding integration

We could go to market exploring "What type of Google partner are you?" Our lead pitch would be the full DRX stack. Pubs benefit from market leading programmatic direct and indirect offerings that seamlessly integrate to most effectively manage demand from all sources. Or, perhaps our partner chooses to work with another ad server, the DRX Indirect header bidding solution brings the power

of all indirect demand that flows through the Google platform to our partners with per impression pricing that integrates into their existing ad server. Lastly, if the partner has historically elected to not work with Google sell-side products but enjoys the benefits of Google demand we are pivoting our approach to capture additional share of wallet from these partners. To ensure Google demand is positioned as effectively as possible GDN and DBM will only buy through a Google tag but now you can integrate only GDN/DBM without any of the extra demand features.

For this to be effective we must figure out a few key strategic points:

- **Pricing Strategy:** must figure out how to ensure Google margin is near uniform across the three approaches
    - Ideas to be explored: DBM recontracting, set sell-side revenue shares for each approach, opaque sell-side business terms for GDN/DBM approach
    - The annual sell-side pricing review is kicking off in early/mid Q1.
- **Buying Strategy:** this direct to publisher approach will be most successful if GDN/DBM stop buying via other channels. Is this possible without significant loss in reach or revenue?
- **New Network Strategy:** need to understand how GAIA based demand will be most effectively delivered to pubs and whether the New Network could help enforce our pricing or buying strategy. A potential path forward is to integrate NN demand as a unique demand source via this direct to publisher approach, taking a slower approach, versus existing using existing GDN/DBM demand