

Programmatic Advertising – Header Bidding

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Abstract - Programmatic advertising is now the dominant form of buying and optimising digital advertising. It is a major component of modern advertising. In 2020, it is predicted that 65% of all money spent on advertising in digital media will be traded programmatically and that advertisers will spend an astonishing US\$84bn on the format worldwide. Programmatic advertising has been referred to by many as the 'blackbox' of online marketing, filled with jargon and almost exponential in its growth. Programmatic advertising is the automated transaction of buying and selling advertising online. It's the process of using different platforms to sell inventory on publishing sites and on the advertising side, buying inventory and placing ads on a publishers site.

This used to be quite a manual process, that involved requests for proposals (RFPs), human negotiations, and manual insertion orders. Now, the whole transaction from beginning to end occurs in milliseconds and involves many platforms.

Keywords: Programmatic, Marketing, Publisher, Advertiser, Media.

I. Introduction

Whilst it may seem to lurch from one existential crisis to another – spanning ad fraud, viewability, and walled gardens, to name a few – what is undisputed is that programmatic is, and has been for several years now, mainstream and dominating the agenda. It is shaping the fabric of marketing planning and investment across the globe.

The evolution of programmatic has been breathtaking. In several years, it evolved from the wild west days of remnant inventory to an increasingly sophisticated ecosystem in which big brand marketers are buying larger and larger amounts of premium inventory, overlaid with data-led decisioning and programmatic workflow efficiency.

Such rapid evolution has been driven by the accelerated maturity of the industry and the sophisticated demands we see today. Brands are now making ultimatums regarding levels of transparency and openness, as highlighted by P&G's Marc Pritchard at the IAB Annual Leadership Meeting.

The demand side is increasingly focused on priority access to quality inventory through PMPs (private marketplaces) and programmatic direct, rather than just low-cost inventory through open auction. With the supply side emerging more confident and influential than ever, publishers are taking back control of their monetisation and challenging the dominance of the Google-Facebook duopoly.

With the ecosystem dynamics shifting and levelling the playing field, publishers are beginning to find themselves with unprecedented influence, raising the question of how they can fully realise this opportunity.

II. Related Work

Recent leads in programmatic advertising describes the ways in which programmatic advertising can be practised i.e :

1. Real-Time Bidding(RTB).
2. Private Marketplace(PMP).
3. Preferred Deals.
4. Programmatic Guaranteed.

Real time bidding (RTB) has given new life to traditional display advertising. It uses many layers of data to target ads in real time with unprecedented accuracy. The platform processes hundreds of thousands of ad opportunities in milliseconds and decides which one is best for your audience and budget.

Real time bidding (RTB) is a server-to-server buying process that allows inventory (ad space on websites) to be bought and sold on a per-impression basis. It happens instantaneous through an auction that determines who gets to buy a specific impression. It happens programmatically in the same way as financial markets do. If a bid is won, the advertiser's ad is immediately shown on the bought publishers site.

RTB is a decision process within programmatic however not all programmatic advertising uses RTB. For example, programmatic direct refers to an arrangement made directly between advertiser and publisher where inventory is agreed at a fixed price for a guaranteed number of impressions however the execution is carried out programmatically (in an automated way).

Therefore, a real-time auction is not carried out. As the name implies, RTB operates on an auction model. You set the max bid (CPM) that you will pay for a placement and win impressions at \$0.01 above the next highest bidder. Here is an illustration:

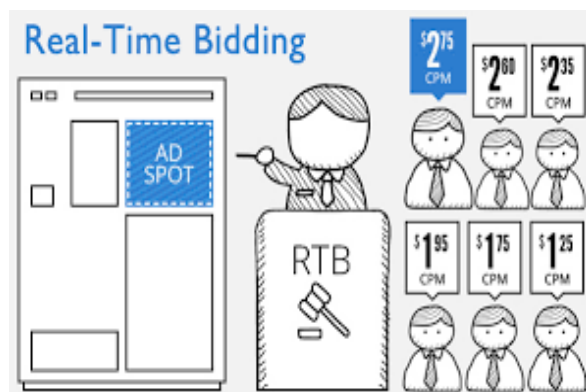


Fig -1: Real-Time Bidding

III. Header Bidding

Header bidding made it to ad tech somewhere around 2014. And only after one year, in 2015, the technology went viral. In the beginning, header bidding was variously called tagless, pre-bidding, full bidding, parallel auction, and many other names, as reported in the Digiday feature. In June 2018, AdExchanger published an article on header bidding, and the term was cemented. And the rest, as they say, is history. Seeing its benefits over publisher waterfall, the industry started investing in the tech. Fast-forward to 2020, most publishers monetize their ad inventory via header bidding along with other methods. Header bidding really took off with the publisher community, Google Trends graph shows the search interest for the term over time. Despite its widespread adoption and popularity, the technical aspects of header bidding still remain a mystery to many publishers.

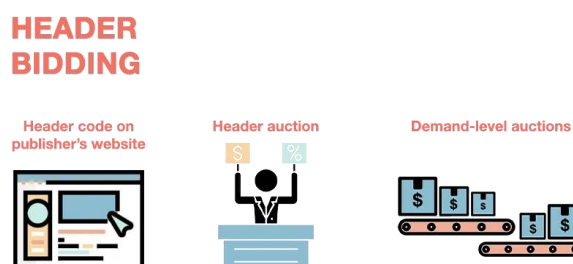


Fig - 2: Header Bidding

Header bidding is a type of programmatic auction in which bid requests are simultaneously sent to multiple demand partners in real-time—which means that every single ad impression has the chance to be purchased at its maximum value, based on available demand. These bids are then passed through various filters (floor price and targeting criteria) configured by publishers in their ad server. The highest bid is selected from the filtered bids, and then finally, the ad creative is displayed on the user’s screen. This entire process takes a fraction of a second.

Header bidding requires a JavaScript code snippet to be added to the <head> section of the website. This JS code enables publishers to generate bid requests by using browser resources. Basically, real-time bidding is an umbrella term and header bidding falls under it as an advanced bidding solution.

Need— Before header bidding, publishers were using the waterfall method of ad serving (also called daisy-chaining) to sell their inventory, under which, the entire inventory is presented to one bidder at a time. The first bidder buys some inventory and the remnant inventory is passed on to the next bidder. Similarly, the next bidder buys another part of the inventory, and then again, the remnant inventory is passed to the next bidder in line, and so on.

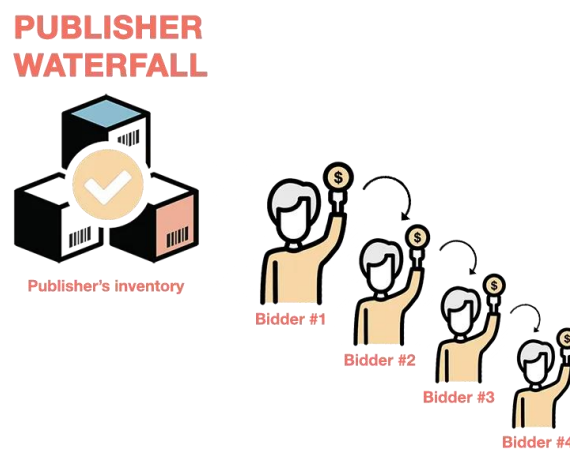


Fig - 3: Publisher Waterfall

The publisher waterfall was a really inefficient way of selling inventory. For starters, the inventory took a lot of time to sell, moving from bidder to bidder. Next, publishers were not getting the true value of their impressions. For instance, there were chances that the next bidders in line may have been willing to pay more, but the premium inventory already sold to previous bidders at a lower cost. And there was no way to compare performance and optimise it. Before header bidding became popular, Google had a monopoly on the ad tech supply chain. Google was (and to some extent, still is) closed to sharing its trade tactics.

Enter header bidding:

- 1) Since the header auction is real-time, it gives publishers the chance to maximize the revenue generated from every single impression.
- 2) Since header bidding sends bid requests simultaneously to all the demand partners, it gives them equal opportunity to make their bids.
- 3) Based on the bids submitted, publishers can compare the performance of each transaction using log-level data and work on tweaks for greater yield.
- 4) It is designed to take precedence over Google auctions. Hence, impressions go to header bidding partners and then to Google’s ad server.

Header Bidding Wrapper—

HEADER BIDDING WRAPPER

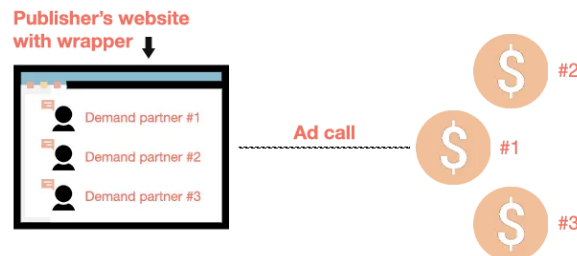


Fig - 4: Header Bidding Wrapper

Since for each impression, the browser generates an individual bid request to all demand partners, publishers need to insert every demand partner’s code snippet on their website. Inserting or deleting these snippets of code each time a demand partner is added or dropped can get tedious really fast. Also, making constant changes to the header code of a website without dedicated developer support can lead to site outages or the layout being disrupted. To eliminate these issues (at least to an extent), header bidding wrappers were developed.

A header bidding wrapper works like a container that holds the code snippets from all the demand partners in one place. Some wrappers even offer a GUI, so publishers don’t have to mess around with code at all, instead toggle demand partners on and off from a control panel. Along with that, the wrapper can also be used to set a floor price and the timeouts. Some well-known header bidding wrappers are Prebid.js, Pubfood.js and BiddR³⁶⁰.

IV. Implementation

Header bidding starts as soon as a web page begins to load on the user’s browser, in parallel, the wrapper initiates the auction by sending bid requests to the demand partners.

Header auction works on the first-price auction model, which means that the highest bidder gets to serve their ad creative, and they pay exactly what they bid during the auction.

Before header auction bids are submitted to the wrapper, the demand partners run their own auctions to decide which advertiser or DSP will participate in the main header auction. Header bidding can be broadly classified into two types: client-side and server-side.

CLIENT SIDE & SERVER SIDE



Fig - 5: Client side and Server side

In the case of client-side header bidding, the auction runs on the user’s browser. On the bright side, browser auction offers improved targeting due to better cookie match rates with publishers having access to more bid level data. However,

client-side header bidding is notorious for causing high page latency, due to higher browser resource and network consumption.

In the case of server-side header bidding, the auction is conducted on a dedicated auction server away from the user’s browser. This technique saves network bandwidth and browser resources, decreasing page latency as a result. However, when it comes to targeting, the server-side method fails to deliver the desired results due to decreased cookie match rates.

Amazon offers two server-side header bidding solutions—Transparent Ad Marketplace (TAM) and Unified Ad Marketplace (UAM). Where UAM is for small- and medium-sized publishers and TAM is for enterprise publishers.

In order to get the best of both auction types, publishers can also choose **hybrid header bidding**. This is where publishers run both client-side and server-side header bidding together, usually within a multivariate testing environment. In case no demand partners’ bid meets the floor price or the timeouts have exhausted, the inventory is offered to fallback networks like AdSense and AdX, based on Ad Manager settings.

V. Comparisons / Enhancement for Header Bidding

Because programmatic initially was built on the waterfall (sequential bidding), it often caused problems with inventory underestimation and decreased the publisher’s revenue as a result.

In a waterfall auction, when the impression became available, it was offered to the first-tier buyers. If nobody from the first row swallowed the bait, the impression was suggested to the next tier and so on until someone bid on it.

The process of ad prioritization was managed through the publisher’s ad server, which gave preference to advertisers who reserved impressions. Demand partners could compete only for unreserved impressions on a cost-per-thousand (CPM) and fill-rate basis.

Publishers did not receive the real value of their inventory and had to jump from one ad network to another trying to sell the remnant inventory via direct deals or on private auctions.

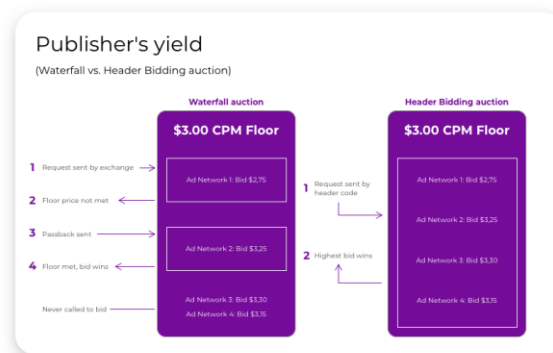


Fig - 6: Publisher’s yield

Implications of the latest changes in header-bidding—

First-price auctions as a rule of thumb. While, the whole world transitions to the first-price auction so does header-bidding. In first-price auctions, advertisers pay the exact price they win the impression with, whereas in second-price the winner pays the second-highest price + 1 cent which opens a gateway for manipulations. In 2019, expect that the majority of header-bidding solutions will go first-price auctions as this way the trading gets more transparent for all parties.

Bid shading is arriving. For many DSPs running on second-price auction, transitioning to the first-price will be technically challenging. Likewise, it will be difficult for advertisers to adjust their bidding strategies at first. As a temporary measure appeared bid shading practice that evens out the difference between first and second price. In simple words, it is a discount that the winner gets, it prevents media-buyer from potential overpaying.

Mobile and native define the future. Header-bidding is no longer a solution for standard display ads. Although traditional banner advertising is convenient and affordable, publishers need to include mobile, native, and interactive video formats in their header-bidding strategy to maximize yield and user engagement in 2019.

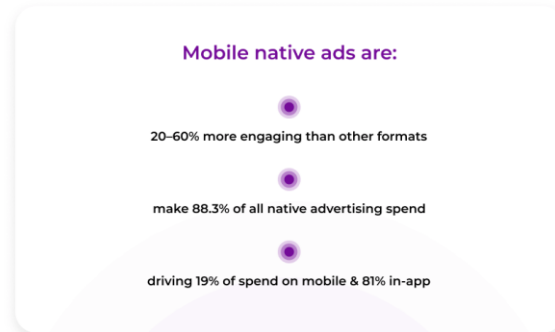


Fig - 7: Mobile Native ads

VI. Application

Header Bidding is usually applied using a common and majorly used Prebid, Prebid now offers a multi-format solution to allow publishers to put outStream / Native / banner formats in competition, however the auction is hosted for different payout models. For example, banner pays on CPM whereas outStream pays on vCPM. At Teads we predict a vCPM probability, meaning that we factor in scroll rate and creative errors to the returned bid price. The reason this is important is that it makes the auction fair, as returned bids are all for the same CPM model, not a mix which gives vCPM buyers an unfair advantage.

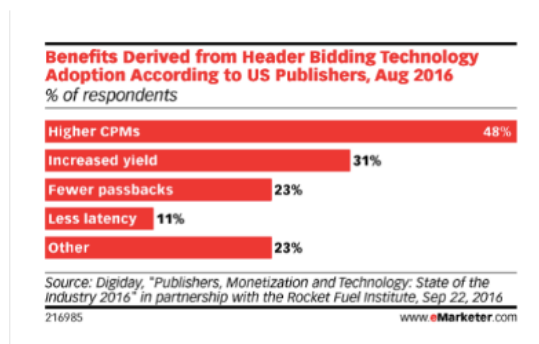


Fig - 8: Benefits of Header Bidding

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