

# **UNDERSTANDING IN-APP HEADER BIDDING**

**THE ESSENTIALS**



# INTRODUCTION

Consumers downloaded 204 billion apps in 2019,<sup>1</sup> as users around the world shifted to mobile-first browsing behaviors. This shift in user behavior has driven advertisers to follow their customers into app environments, creating a booming opportunity for app developers.

Three key trends have impacted how advertisers have changed their investing strategies to give mobile publishers a unique opportunity:

## 1 MOBILE AD SPEND IS ON THE RISE

Digital ad spend was expected to surpass traditional media, including TV, for the first time in 2019,<sup>2</sup> with the majority of digital ad spend going to mobile devices (including both mobile web and in-app).

## 2 BRANDS PREFER TO BUY APPS PROGRAMMATICALLY

Programmatic strategies tend to get a larger portion of in-app advertising budgets. On average, 66% of in-app budgets go to programmatic direct or open exchange strategies as compared to 34% for direct buy.<sup>3</sup> As a result, mobile advertising now accounts for the majority of global programmatic ad spend, with over 80% of all programmatic display dollars in the US and UK going to mobile.<sup>4</sup>

## 3 PROGRAMMATIC IN-APP BUDGETS ARE GROWING

As buyers shift their spend to mobile channels, programmatic in-app is experiencing some of the biggest opportunities. Recent research found that 30% of buyers planned to grow their programmatic direct in-app budgets by more than 10% the following year.<sup>5</sup>

As mobile advertising continues to grow, app publishers who want to scale effectively and get a slice of growing brand dollars will embrace programmatic selling through header bidding.

**In this paper, we'll cover the essentials of in-app header bidding, including:**



**MONETIZATION  
APPROACHES**



**BENEFITS OF IN-APP  
HEADER BIDDING**



**HOW "HEADER BIDDING"  
WORKS IN APPS**



**EVALUATION  
CRITERIA**

# MONETIZATION APPROACHES

There are two main types of monetization approaches leveraged by mobile apps: waterfalls and header bidding. The waterfall setup is most widely leveraged by ad network SDKs, which historically have had little expertise in programmatic technology and relied on their relationships and scale. More recently, app developers began adapting the monetization technologies from the web to app environments, leading to a rise in unified auctions for apps (also known as in-app header bidding).

The easiest way to get started with mobile app monetization is to integrate an ad network SDK. With an ad network SDK, a publisher can make a request for an ad, and if the ad network SDK returns an ad, the publisher can show the ad to the user. As more ad network SDKs get added to an app, the publisher will need to implement a way to determine in which order the ad network SDKs will be given a chance to fill with an ad. This ordered list of ad network SDKs or demand sources is called ‘waterfall’ (Figure 1).

In a waterfall mechanism, the first ad network SDK in the ordered list is given a chance to return an ad. If it fails to fill the impression, then the opportunity to show an ad is passed on to the second, and then the third ad network SDK, and so forth. The order of the waterfall can be based on manually set prioritization rules and/or based on aggregate historical pricing data. Once an ad network fills an impression, the subsequent ad network SDKs are closed out of the monetization process and any possible higher bids from the lower ranked demand sources are never realized.

Alternatively, header bidding (also called “parallel auctions” and “unified auctions”) involves simultaneously collecting multiple bid requests and responses before passing them through to an ad server. With header bidding, publishers can send a single ad impression opportunity to multiple SSPs in parallel, who each, in turn, send that impression opportunity to each of their DSP partners (Figure 2).

FIGURE 1

## WATERFALL

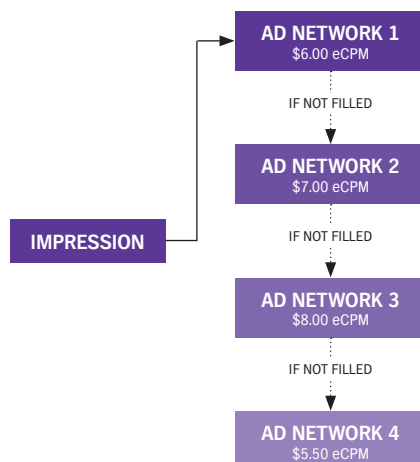
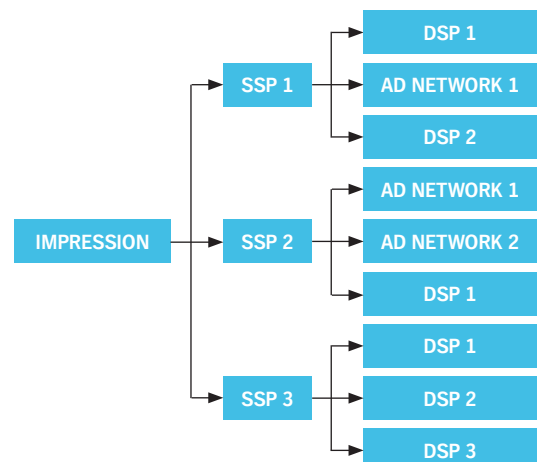


FIGURE 2

## HEADER BIDDING



# BENEFITS OF IN-APP HEADER BIDDING

Header bidding provides publishers with a number of monetization benefits by flattening the waterfall setup. First off, publishers who adopt header bidding strategies receive incremental value from increased demand. These publishers can access differentiated demand and brand spend coming through programmatic budgets, which are now flowing increasingly to mobile apps. Additionally, this demand can scale effectively through server-side bidding, instead of adding each demand partner as an SDK as in the waterfall method. Demand now isn't a tradeoff between app performance (SDK bloat and maintenance) and monetization growth.

## SPECIFIC BENEFITS OF HEADER BIDDING FOR MOBILE APPS



### INCREASED BID DENSITY

Header bidding exposes a greater portion of impressions to a buyer (i.e. increasing bid density), greatly increasing the data that DSPs can action and bid on. The increased bid density results in greater competition that increases total revenue.



### INCREASED FILL RATE

By adding multiple cloud demand partners, publishers increase the chance of having bids for each ad impression opportunity.



### INCREASED BID RATE

With programmatic demand, it is easy to run floor price testing using real-time CPMs (vs. historical CPM data), leading you to maximum revenue per ad impression opportunity.



### IMPROVED DEMAND OPTIMIZATION

Adding multiple cloud demand partners vs. direct demand partner SDK integrations allows you to scale demand opportunities. Plus, adding or removing cloud-based demand sources does not require changes to your app or app store approvals.



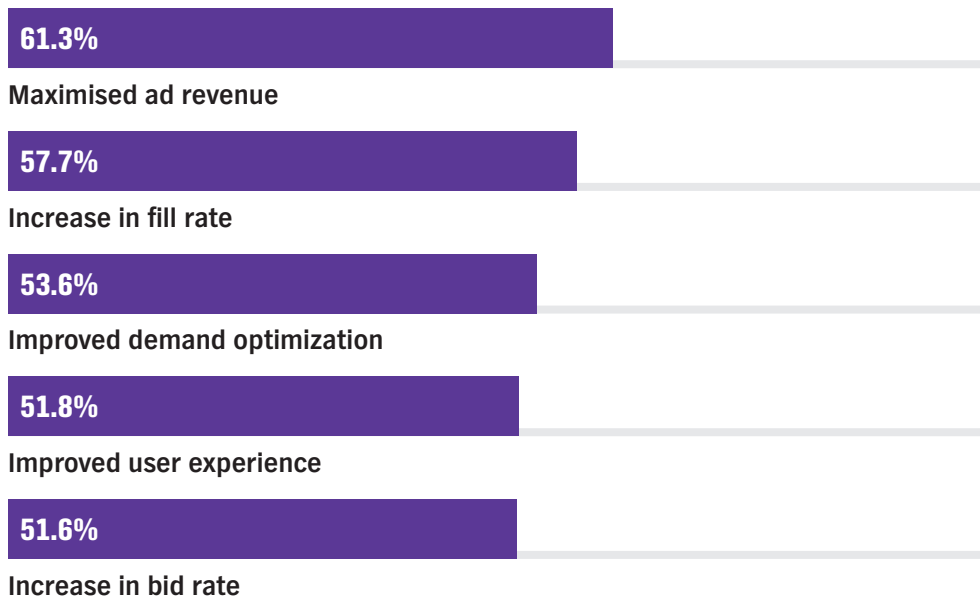
### IMPROVED USER EXPERIENCE

Running parallel auctions server-side reduces latency issues, with fewer passbacks compared to the waterfall method. Plus, brand campaigns coming from programmatic budgets provide a better user experience than cost-per-install (CPI) campaigns that drive users out of your app.

For video inventory in particular, the majority of surveyed omnichannel publishers in PubMatic's recent research cited maximizing ad revenue, increasing fill rate, improving demand optimization, improving user experience, and increasing bid rate as part of their top 5 benefits realized from header bidding (Figure 3).<sup>6</sup>

FIGURE 3

### TOP BENEFITS REALIZED FROM VIDEO HEADER BIDDING



Base: 612 director level and above sales, operations, and IT professionals at publishers/media companies in the US, Europe, and APAC  
Source: "Video Advertising Requires New Monetization Strategies," a commissioned study conducted by Forrester Consulting on behalf of PubMatic, January 2020

Because of these benefits, header bidding is rapidly becoming a best practice for app publishers that wish to monetize and effectively manage their inventory. These benefits drive growth in implementation for mobile, with 57.4% of mobile publishers choosing client-side header bidding integration as a top strategy in use.<sup>7</sup>

# HOW HEADER BIDDING WORKS IN APPS

In order to take advantage of the benefits of header bidding, it's important to understand how it's used in app formats. Header bidding technology emerged from the world of desktop publisher advertising. Publishers would add a wrapper to the header section of their website—code that enabled the publisher to send an ad request to multiple demand partners. But, in the app world, there is no “header.”

So, header bidding technology has adapted to meet the mobile world. Instead of relying on a website's “header”, in-app header bidding works with an SDK integration that generates the ad requests for a publisher's app. This ad request is then auctioned in the cloud with server-side demand partners, returning a response back to the client-side SDK once there is a winning bid.

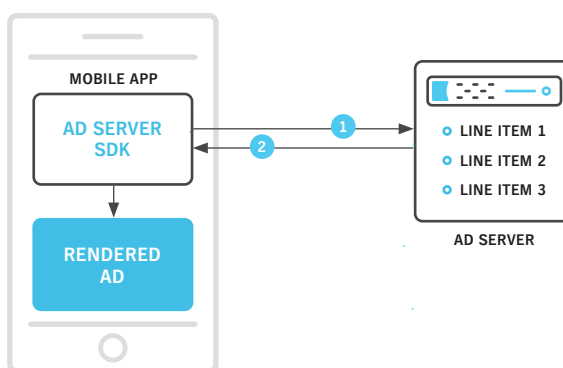
In-app header bidding can operate two ways within an app's infrastructure, depending on the rest of the publisher's mobile ad stack:

## IN-APP HEADER BIDDING WITH DIRECT DEMAND IN PRIMARY AD SERVER

A mobile app will often choose to have a primary ad server if they have a sales team dedicated to selling in-app inventory to advertisers. Demand generated from such effort is normally referred to as ‘Direct Demand.’ This direct demand is often fulfilled with a primary ad server such as Google Ad Manager or MoPub (Figure 4).

FIGURE 4

### APP ARCHITECTURE WITH A PRIMARY AD SERVER



Direct demand translates into 'orders' and 'line items' within the realm of a primary ad server.

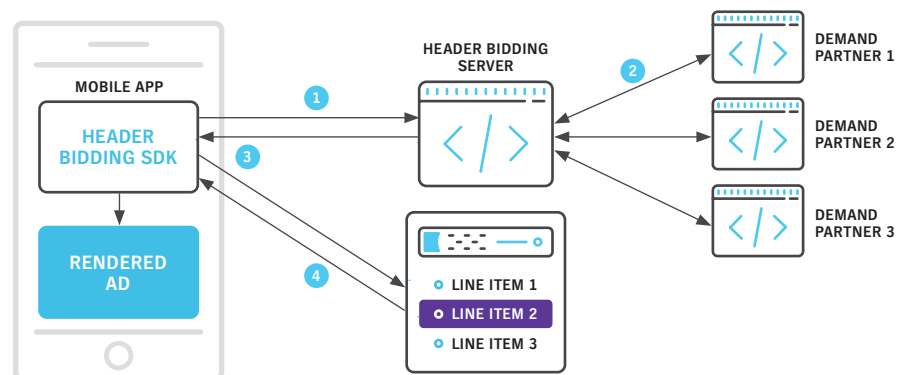
- **ORDER:** An agreement between an advertising seller and a buyer that specifies the details of an advertising campaign. Orders contain one or more line items.
- **LINE ITEM:** An advertiser's commitment to purchase a specific number of ad impressions (CPM), user clicks (CPC), on certain dates at a specified price. A line item specifies where an advertiser's ads will appear, and may specify when an ad may be shown.

As a mobile publisher starts to have multiple orders and line items set up in their primary ad server, their operations team will need a process by which to determine the order in which they are served. These are managed by priority levels and prices of the line items.

In this scenario, header bidding SDKs are integrated into primary ad servers (Figure 5) to bring more competition for inventory against direct demand. Header bidding SDKs make an ad request to the header bidding server, which will then run a cloud-side auction and send the winning bid to the client. The header bidding SDK then passes on the bid price of the winning bid to the publisher's primary ad server. If their primary ad server finds an ad higher than the bid price, the primary ad server SDK will render the ad. If not, the header bidding SDK (or ad server SDK<sup>8</sup>) will render the winning bid from the header bidding server-side auction.

FIGURE 5

## IN-APP HEADER BIDDING WITH A PRIMARY AD SERVER



## IN-APP HEADER BIDDING WITH NO PRIMARY AD SERVER

App developers without sales teams to sell mobile in-app inventory tend to simply leverage ad network SDKs. To maximize ad revenue, a publisher may add multiple ad network SDKs and set them up in manual waterfall where one ad network SDK is asked to serve an ad (Figure 6). If there is no ad from that SDK, the app code will go to the next ad network SDK.

Many app developers are looking to remove their low performing ad network SDKs and add one SDK that can connect to multiple cloud side demand sources. Header bidding solutions can support this approach, reducing the client-side latency by taking advantage of much faster cloud-side auctioning and removing the wait time for ad network SDKs. Publishers will add the header bidding SDK as the first rung in their waterfall setup, so it will auction and render creative if the winning bid clears the publisher's floor price (Figure 7).

As a result, integrating a header bidding solution with a non-ad server setup expands addressable cloud-side demand sources and reduces the number of ad network SDKs that aren't performing in an app, while maintaining SDKs that continue to perform and generate revenue.

FIGURE 6

### APP ARCHITECTURE WITH NO PRIMARY AD SERVER

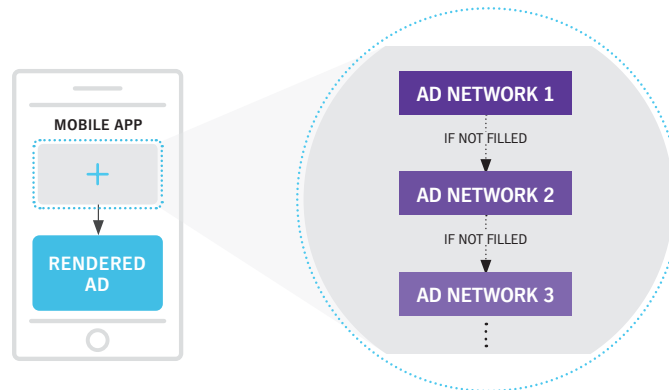
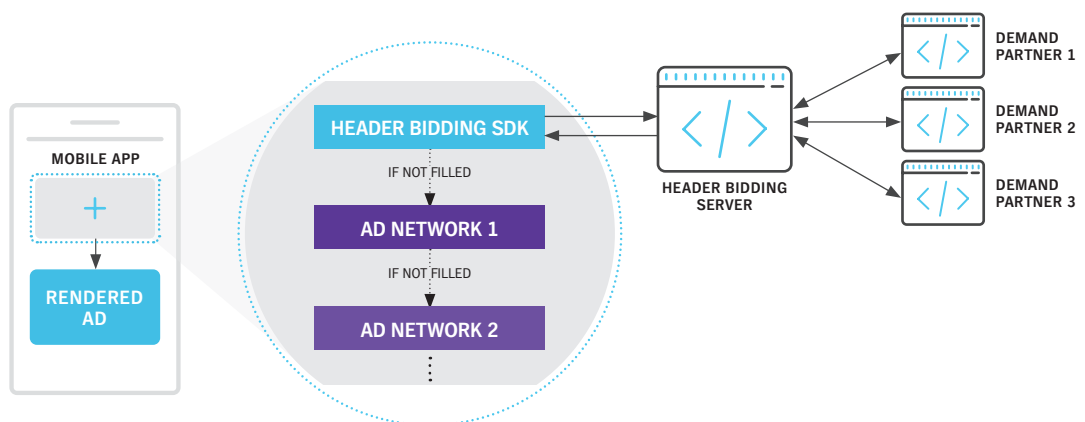


FIGURE 7

### IN-APP HEADER BIDDING WITH NO PRIMARY AD SERVER





# EVALUATING YOUR IN-APP HEADER BIDDING OPTIONS

The journey of modernizing your mobile ad stack starts with education about in-app header bidding. But, how does a developer successfully transition into an in-app header bidding setup? Luckily, there are three main approaches available:

1. **Building With Open Source**
2. **Choosing A Partner Built On Open Source**
3. **Choosing A Partner Who Has A Proprietary Header Bidding Solution**

Prebid.org is the ubiquitous option for open source header bidding, promoting transparency and fairness, with easily verifiable code, and provides publishers a wide choice of partners. It enables collaboration to develop flexible, effective solutions. Some partner solutions support Prebid, and additionally help with integration support, troubleshooting, and optimizing yield. Other solutions are based on proprietary technology, which offers less transparency and control than options in the open source space. In order to find the approach that meets your need and goals, there are a few key areas to consider:

- Internal Resources and Investment
- Measurability
- Programmatic Demand via SPO

## INTERNAL RESOURCES AND INVESTMENT

Open source has a wealth of control and innovation, but success requires technical specialization, education, and management. The main question developers should ask is how much resources they want to invest into building and maintaining their monetization ad stack versus investing into further developing and improving other areas of their app experience. If a developer intends to make advertising central to their product strategy, it makes sense to build in-house. If advertising is meant instead to fuel their product strategy, developers may end up diverting dev resources and time away from core priorities.

Knowledge of in-app header bidding can be a confounding factor when evaluating your internal investment goals. In mobile ad tech, there is a clear divide between legacy solutions like ad networks and waterfalls, and in-app header bidding. Developers working on the one may not have a full understanding of the challenges involved in the other.

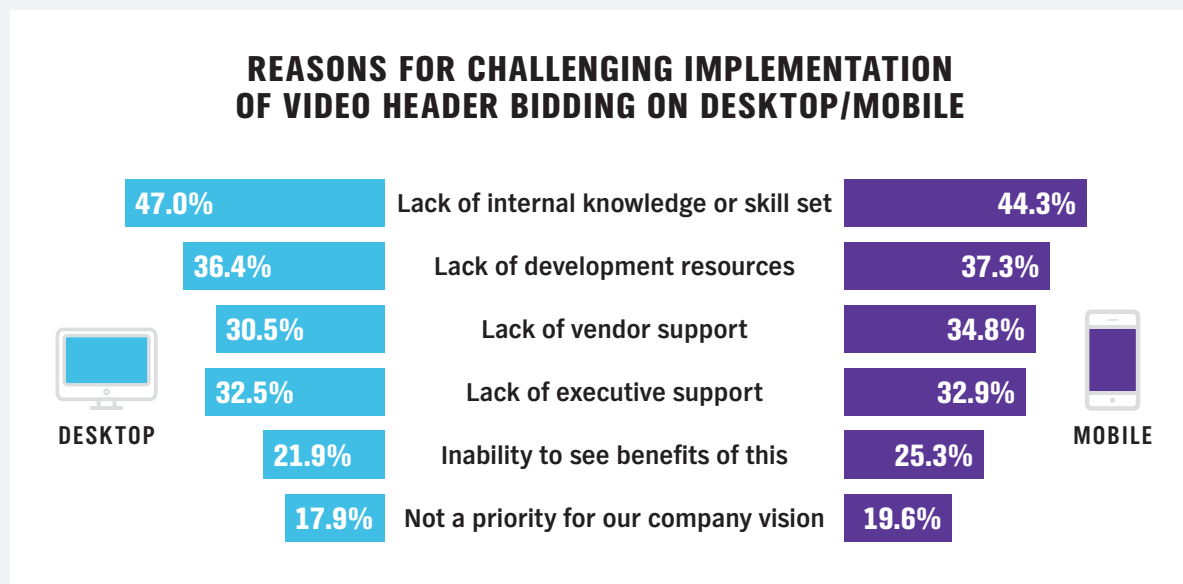
As a result, many who attempt to move from legacy methods to in-app header bidding on their own have faced challenge, including:

- **DEPLOYMENT:** Client-side SDK integration troubleshooting (especially with Android).
- **MAINTENANCE:** Technical fixes around banner refresh mechanisms—this involves figuring out how to make the in-app header bidding solution work seamlessly with a primary ad server SDK.
- **OPTIMIZATION:** Primary ad server line item management issues, such as missing certain parameters and mis-configuring keywords or parameters, can lead to poor yield.
- **UI/REPORTING:** Developers are on their own to set up reporting analytics that give header bidding auction level insights as well as aggregation of data across multiple demand sources.

Not only are developers new to the domain, and building with open source, more likely to run into mistakes and issues, but they will also face challenges trying to resolve them alone. These types of friction points can heavily impact operations, so it's important to make sure you've considered the trade-offs in resources and time beforehand.

Video header bidding implementation is particularly tricky to develop in-house. Although header bidding is a proven solution for many monetization challenges, 39% of publishers find video header bidding implementation challenging for mobile.<sup>9</sup> While the lack of internal knowledge, skill sets, and development resources top the list for both, those faced with mobile implementations are more likely to cite a lack of vendor support as a reason for their challenges (see Figure 8).

FIGURE 8



Base: 612 director level and above sales, operations, and IT professionals at publishers/media companies in the US, Europe, and APAC  
Source: "Video Advertising Requires New Monetization Strategies," a commissioned study conducted by Forrester Consulting on behalf of PubMatic, January 2020



## MEASURABILITY

Historically, viewability measurement with mobile in-app had been dependent on a developer's ability to integrate many different vendor SDKs. Frustrations over having to implement multiple measurement SDKs, maintenance issues, cost, and negative user experience were the catalysts for a new uniform standard—the Open Measurement SDK.

In 2018, the IAB Tech Lab released their highly anticipated Open Measurement Software Development Kit (OM SDK). OM SDK is the IAB's scalable solution for a single SDK to cover all in-app viewability and verification. It is designed to facilitate third-party viewability and verification vendors to measure impressions for ads served to mobile app environments without requiring their own SDK. The single OM SDK design allows all measurement partners to pick up viewability signals through a standardized interface on iOS and Android devices across display, native and video, and eliminates the need for app developers and publishers to implement multiple ad verification SDKs. As a result, OM SDK reduces integration timelines and ongoing maintenance efforts—improving developer experience.

OM SDK is particularly important to app developers moving into programmatic, as 42% of brands and 48% of agencies cite viewability and measurement challenges as a key issue of in-app advertising.<sup>10</sup> If an app developer overlooks integrating a measurement SDK, then their advertising clients will struggle to accurately measure the app's ad viewability. And viewability impacts how campaigns get billed—mainly because advertisers use their programmatic buying platforms to selectively spend on inventory that is highly viewable. Since its release, OM SDK has been the trusted standard for buyers, giving more confidence to buy in-app.

Many managed in-app header bidding solutions, including PubMatic's OpenWrap SDK, come pre-integrated with OM SDK, which ensures that all display and video impressions served by the SDK are viewability measured. If you're looking to widely activate brand dollars, it's important to choose a monetization setup that includes OM SDK support.

## PROGRAMMATIC DEMAND VIA SPO

Supply path optimization, or SPO, allows buyers to choose the best path towards a desired impression. SPO emerged from the boom of header bidding in desktop, which expanded the buying paths for any given impression, since publishers were able to collect bids from multiple SSPs in parallel. This inevitably results in auction duplication for buyers, who are participating in multiple auctions for the same inventory as they send requests across several SSPs.

In order to avoid the risk of being overcharged consistently, buy-side companies have begun to meaningfully assess the relative value of their SSP partners. SSPs are now forced to compete against one another on auction dynamics, transparency and quality of pipes to remain a prioritized partner for any given buyer. In a recent report, we found that most US buyers are

already implementing SPO;<sup>11</sup> 45% of buyers are actively implementing and 28% plan to within the next 12 months. In the UK report, SPO is also top of mind; 87% of buyers are actively implementing SPO or plan to within the next 12 months.<sup>12</sup>

As a result of SPO, not all in-app header bidding partners are created equal. Buyers across agencies, holding companies, and brands are systematically trimming down the number of supply-side partners they work with and primarily buy through (Figure 9). In order to get the best access to demand, it's important to ensure that your in-app header bidding partners are proving themselves valuable to buyers and winning SPO deals to keep bids running through their pipes and toward your inventory.

FIGURE 9

### CURRENT APPROACH TO SPO

61%

Choosing the most effective SSP path to publishers and buying primarily through that path

35%

Consolidating the number of SSP I work with

7%

Employing algorithms to choose the most effective SSP path to publishers

Base: 200 director level and above media professionals made up of brands, agencies and DSPs in the UK.

Source: "The State of Supply Path Optimisation, Progress and Impact in the UK," a joint study conducted in partnership with Digiday, November 2019



## YOUR CHEAT SHEET EVALUATING IN-APP HEADER BIDDING SOLUTIONS

Each in-app header bidding partner should be evaluated against a standard set of criteria to ensure you are set up to gain your full monetization potential. Below is a cheat sheet of key topics discussed in this paper, and how to apply them to your evaluation process.

1	TRANSPARENCY	Questions to Ask
<input type="checkbox"/>	Code	Does your company have shareable code?
<input type="checkbox"/>	Relation to Open Source	Is your company's solution built on Prebid?
<input type="checkbox"/>	Auction-level Insights	What types of auction-level insights do you provide?
2	TECHNOLOGY	Questions to Ask
<input type="checkbox"/>	Ad Server	Which ad servers does your solution support?
<input type="checkbox"/>	Creative Rendering	Does your solution support creative rendering of ads?
<input type="checkbox"/>	Ad Format Support	Does your solution support rich ad formats like video?
3	COMPLIANCE & MEASURABILITY	Questions to Ask
<input type="checkbox"/>	Viewability Measurement	Does your solution support Open Measurement SDK?
<input type="checkbox"/>	Fraud Safeguards	How does your solution combat against fraud and brand safety issues?
4	OPTIMIZATION & SUPPORT	Questions to Ask
<input type="checkbox"/>	Optimization Tools	What demand optimization tools do you offer?
<input type="checkbox"/>	Analytics	What analytics tools do you offer?
<input type="checkbox"/>	Line Item Management	Do you offer multiple line item management support?
<input type="checkbox"/>	Troubleshooting	What type of troubleshooting support do you offer?
<input type="checkbox"/>	Yield Optimization	Is there regular support post-integration for issues such as yield optimization?
5	DEMAND OPPORTUNITIES	Questions to Ask
<input type="checkbox"/>	Cloud-Side Demand Partners	Does your solution support multiple cloud-side demand partners?
<input type="checkbox"/>	SPO	What types of SPO deals has your company secured with buyers and agencies?
<input type="checkbox"/>	Integrations	How many and what quality integrations does your solution have with global and local DSPs?

- <sup>1</sup> "App stores saw record 204 billion app downloads in 2019, consumer spend of \$120 billion," Sarah Perez, TechCrunch, January 15, 2020
- <sup>2</sup> "Digital advertising to surpass print and TV for the first time, report says," Hamza Shaban, The Washington Post, February 20, 2019
- <sup>3, 5</sup> "The Move Toward In-App Advertising," a commissioned study conducted by Forrester Consulting on behalf of PubMatic, January 2019
- <sup>4</sup> "Programmatic Digital Display Ad Spending," Lauren Fisher, eMarketer, November 21, 2019
- <sup>6, 7, 9</sup> "Video Advertising Requires New Monetization Strategies," a commissioned study conducted by Forrester Consulting on behalf of PubMatic, January 2020
- <sup>8</sup> Some header bidding SDKs also render the ad creative, while other header bidding SDKs, such as Prebid Mobile, rely on primary ad server SDKs for the rendering of the creative of ads.
- <sup>10</sup> "Why Is Mobile App Ad Viewability So Hard to Measure?" Ross Benes, eMarketer, Feb 25, 2019
- <sup>11</sup> "The State of Supply Path Optimisation, Progress and Impact in the US," a joint study conducted in partnership with Digiday, November 2019
- <sup>12</sup> "The State of Supply Path Optimisation, Progress and Impact in the UK," a joint study conducted in partnership with Digiday, November 2019

## About PubMatic

PubMatic delivers superior revenue to publishers by being the sell-side platform of choice for agencies and advertisers. The PubMatic platform empowers independent app developers and publishers to maximize their digital advertising monetization while enabling advertisers to increase ROI by reaching and engaging their target audiences in brand-safe, premium environments across ad formats and devices. Since 2006, PubMatic has created an efficient, global infrastructure and remains at the forefront of programmatic innovation. Headquartered in Redwood City, California, PubMatic operates 14 offices and nine data centers worldwide.

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