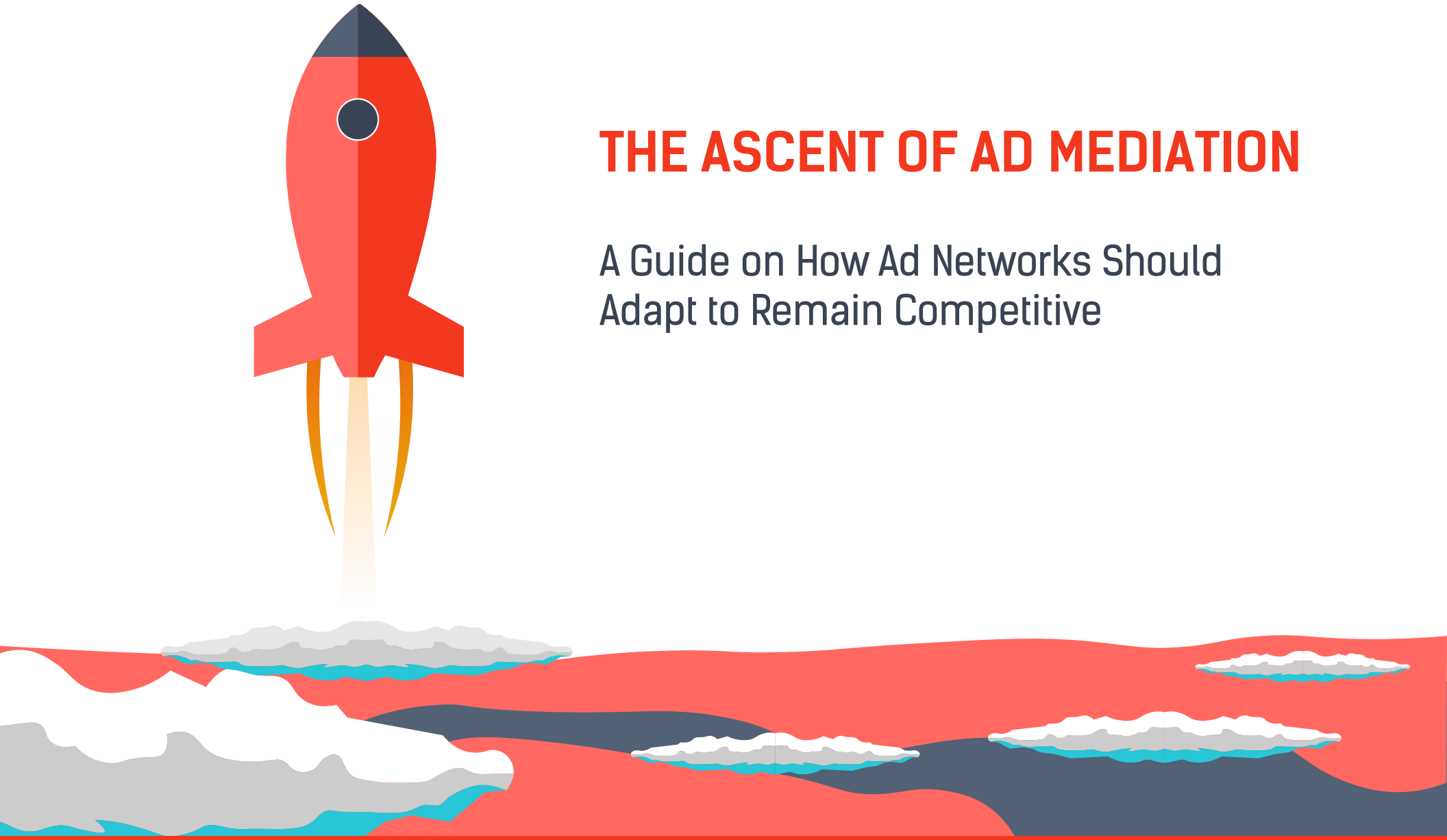

THE ASCENT OF AD MEDIATION

A Guide on How Ad Networks Should Adapt to Remain Competitive

APPODEAL

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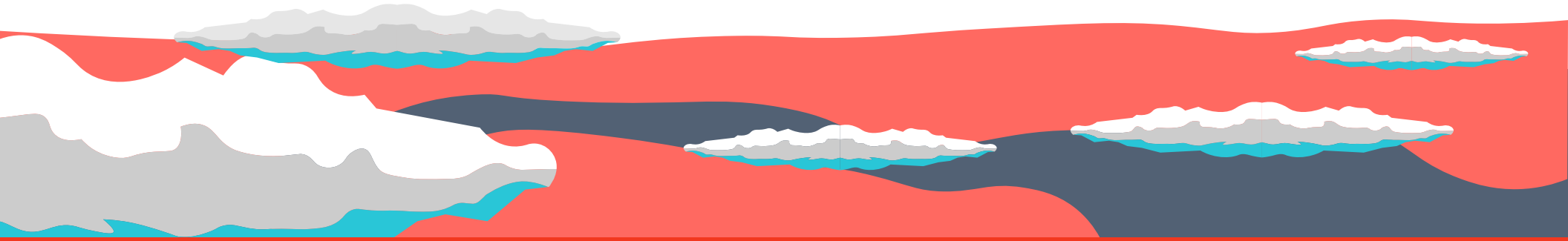


APPODEAL

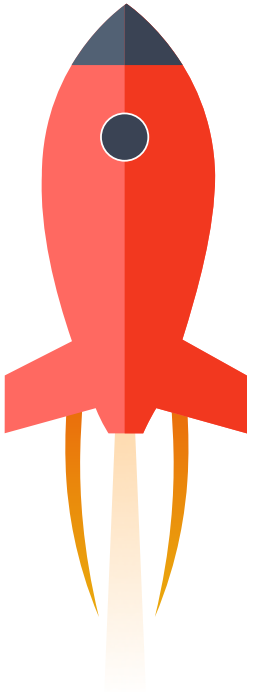
With the ascent of ad mediation in the mobile app ad space over the last few years, traditional ad networks are now at a watershed existential moment.

From the publisher's point of view, integrating an ad mediation SDK, which comes bundled with numerous ad networks, is a no-brainer over integrating individual ad network SDKs.

Seeing what the mobile app ad market is evolving into, it is no surprise that several major ad networks (see AdMob, IronSource and Glispa) have launched or acquired their own ad mediation platforms over the past year. They join the growing ad mediation market that includes Fyber, HeyZap, Appodeal and MoPub.

Since ad mediation is here to stay and will continue to be widely adopted by publishers, ad networks must adapt quickly to remain competitive in this new landscape.

It should serve as a cautionary tale for the mobile world that several desktop SSPs have already seen steep revenue decline for not adapting quickly enough to the new header bidder landscape in the desktop world.



THE CHALLENGES OF MEETING ADVERTISERS' OBJECTIVES

When publishers used to work with just a handful of ad networks, meeting the advertisers' objectives of accessing ad inventory and targeting audience at scale was simpler, since ad networks were usually competing with just 2 or 3 other networks.

However, as ad mediation increases the number of ad demand sources competing against each other in the waterfall for an ad impression from 2 or 3 to more than 20, it is imperative for ad networks to evolve their technology to remain competitive in the mediation arena. Failure to do so means many ad networks' ads will not be served and advertisers' objectives will not be met. Those ad networks will then risk losing advertisers and, ultimately, their revenue.

It's important to note, too, that the algorithms of ad mediation platforms are advancing at the same time. Therefore, ad networks cannot simply adapt to the current ways ad mediation performs. As you will read below, ad mediation platforms have already undergone several major evolutions.

In this white paper, we will explore how ad mediation technology has evolved over the last two years, where it stands now, and where it will likely end up going, so ad networks can make strategic decisions now that will prime them for success in the upcoming years.

Ad demand sources: providers of ads that can come from programmatic sources (RTB marketplaces or exchanges) or non-programmatic sources (traditional ad networks)

Ad mediation has increased the number of ad networks competing against each other for an ad impression from 2 or 3 to more than 20, making it increasingly difficult for some ad networks to serve ads.

1st Model

THE TRADITIONAL WATERFALL

APPODEAL

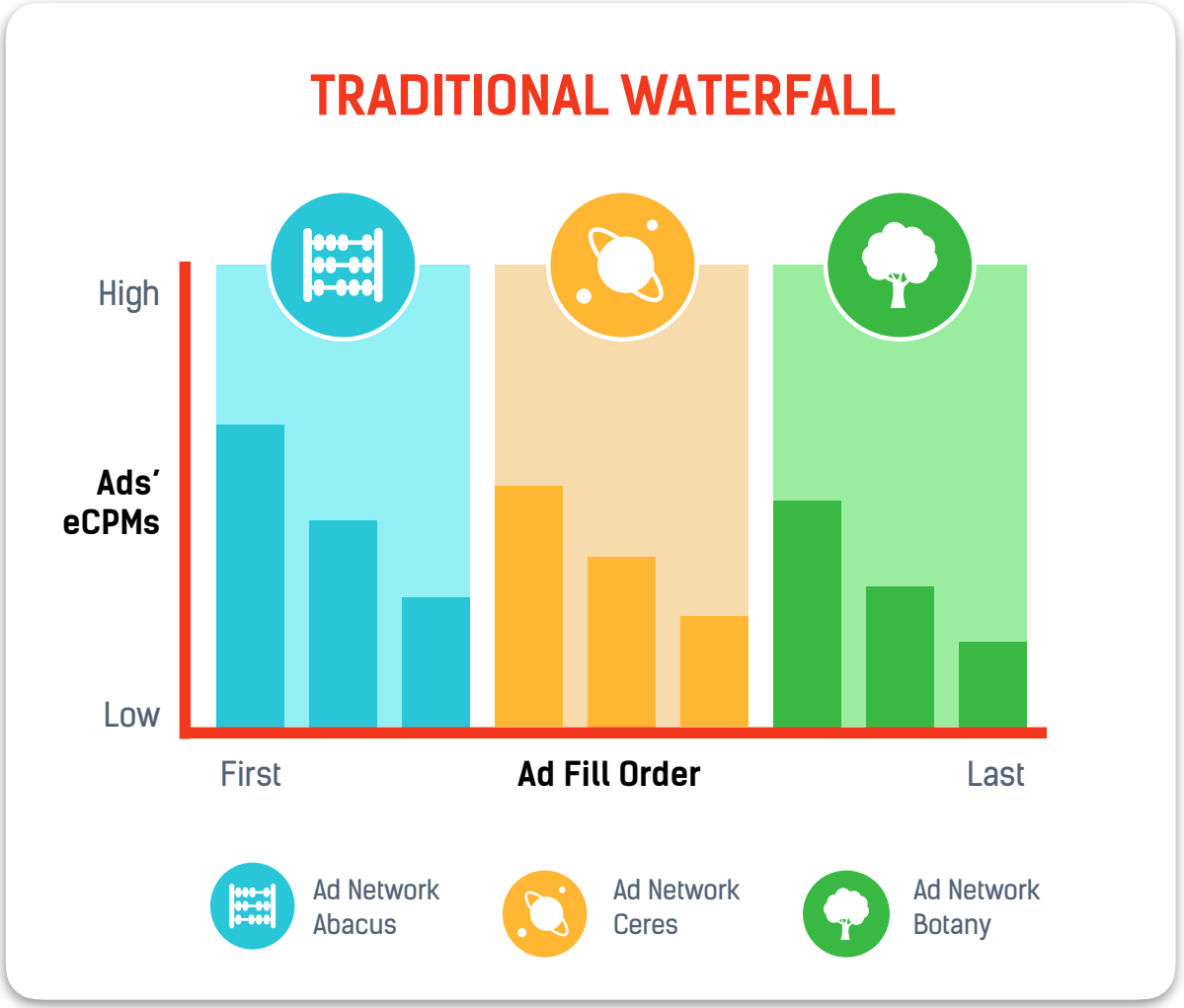
THE TRADITIONAL WATERFALL

The first generation of the ad mediation model grew from the publishers' desire to automate the manual process of ordering ad networks within the waterfall. Known as the "Traditional Waterfall," this model relies on the historical eCPM performances of ad networks to evaluate which ad network gets to serve ads first.

For example, ad network "Abacus" had an eCPM of $10, ad network "Botany" had an eCPM of $7, and ad network "Ceres" had an eCPM of $8 over the last few days.

Under this model, the ads would be served in this order of ad networks:
1. "Abacus" at $10 eCPM
2. "Ceres" at $8 eCPM
3. "Botany" at $7 eCPM

Ads from "Ceres" would be served only after "Abacus" can no longer fill an ad impression, and so on for "Botany".



In the Traditional Waterfall, ads are served in the order of their ad network's historical performance.

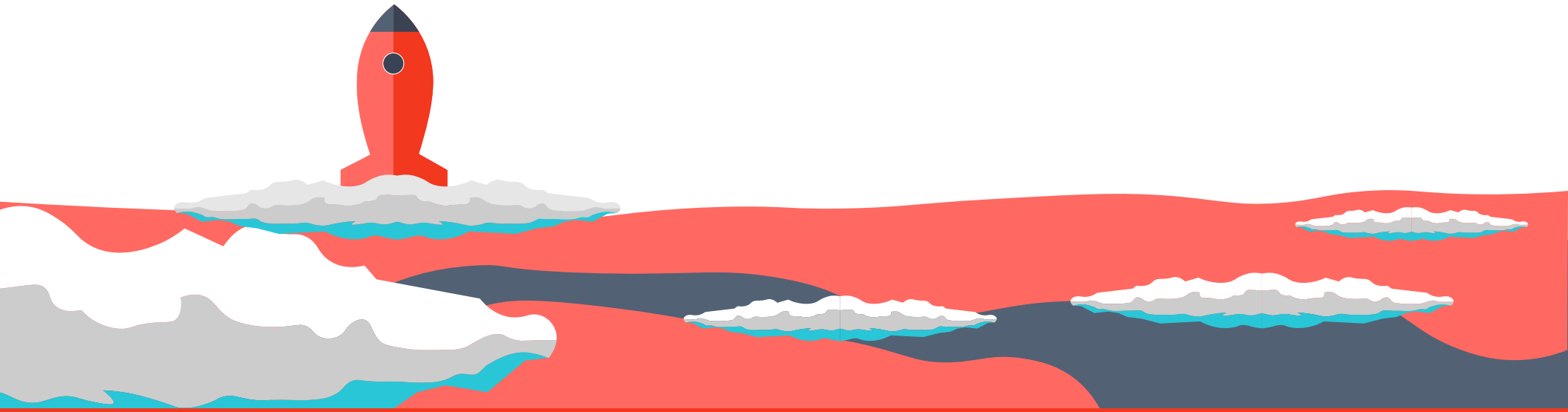
THE TRADITIONAL WATERFALL

When app publishers used to only have a handful of ad networks to manage, this model made sense. However, as the technology and algorithm for filling ad spaces continued to evolve, this model presented some major flaws:

- **Historical performance data is a poor indicator of actual performance** since it is based on an average aggregated number that does not take into account potential new ad campaigns with higher eCPMs.
- **New ads with higher eCPMs might not be served at all as a result,** especially if ad networks further down the waterfall have new ad campaigns but were given a low waterfall position based on outdated historical performance data.
- **No breakdown on performance by impression** to tell whether an impression was worth serving at all. For example, "Abacus'" historical performance eCPM of $10 could have been a result of one converting user that generated $10 for one impression while the 999 other impressions were wasteful and generated $0.
- **No hierarchy of ad placement to optimize the ad networks** that could perform better for leftover impressions. In other words, this model makes sense if all ad impressions across a single session are valued equally. However, that is not the case. The first impression is usually the highest converting, so it is worth more. The subsequent impressions (a.k.a. "Leftover impressions") are less likely to convert, so are worth less. In this model, the first position ad network's higher valued ads would be inefficiently served for leftover impressions when another ad network's lower valued ads could have been a better match for those impressions instead.

2nd Model

INTRODUCTION OF AD PLACEMENTS & FREQUENCY CAPS



APPODEAL

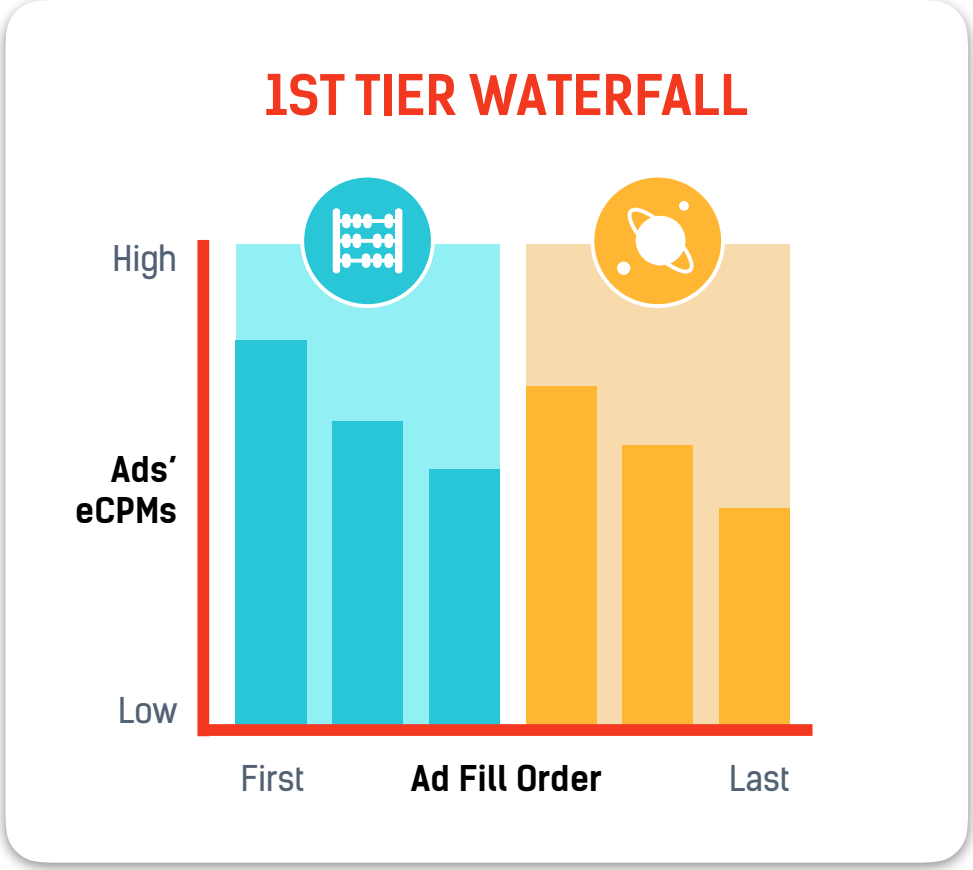
INTRODUCTION OF AD PLACEMENTS & FREQUENCY CAPS

While some first generation ad mediation platforms still use the Traditional Waterfall model, the major flaws in this model gave rise to quick fixes to optimize the wasted impressions issue: the introduction of ad placements tiers and frequency caps.

Instead of treating all ad placements equally by serving ads from the ad network in the first position across all the placements, the introduction of ad placement tiers enables ad networks to compete for different tiers of traffic.

For example, an ad network with high eCPMs would compete with other high eCPM ad networks for the high demand first fill ad placement. These ad networks would be competing together in one waterfall.

To make the higher tiers work optimally for both advertisers and publishers though, it is necessary to introduce frequency capping into this model, which is a limit to how many times a particular ad can be served.

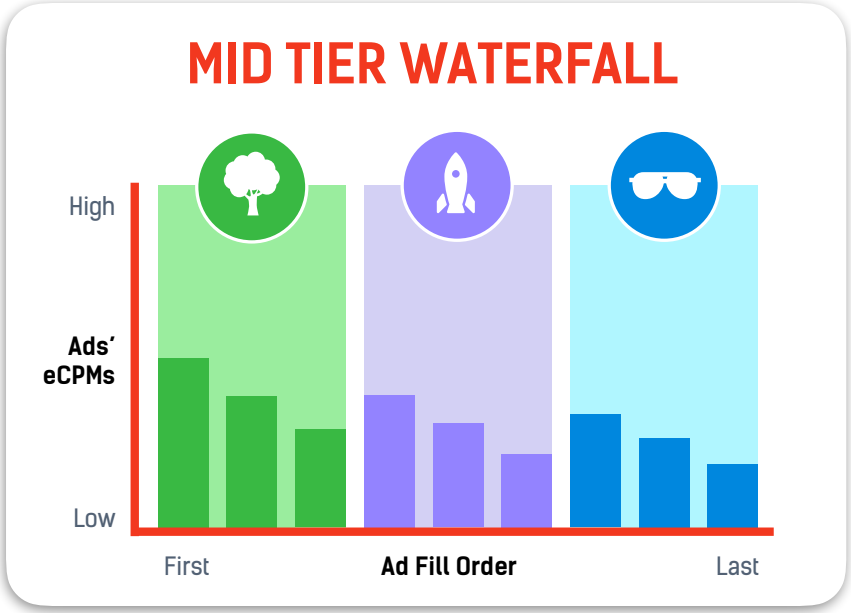


High earning ad networks compete in a separate waterfall with a low frequency cap for the first fill ad placement.

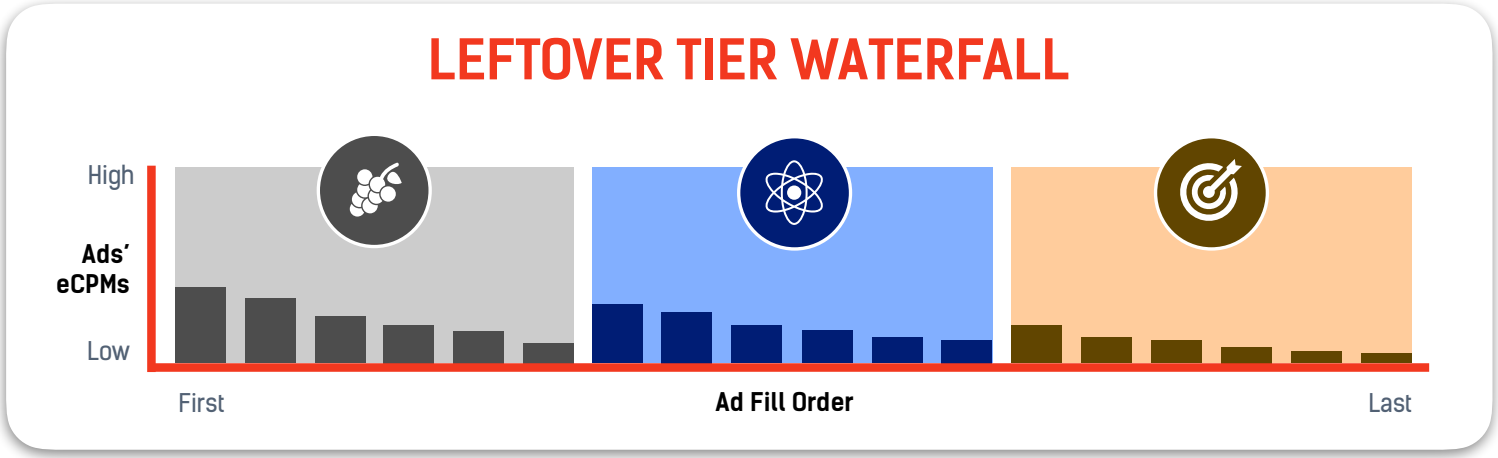
INTRODUCTION OF AD PLACEMENTS & FREQUENCY CAPS

Whereas the subsequent ad placements' impressions are worth less to advertisers and should command a lower price, here, the mid eCPM ad networks can compete among themselves in a separate mid-tier waterfall for the 2nd to 5th ad placements, for example. The 6th and subsequent ad placements would be filled by the low eCPM ad networks competing for the lower-tier (or "Leftover") waterfall and so on.

Opening up the lower valued ad placements waterfall to low eCPM ad networks also has an added bonus of increasing the volume of ads and the ad placements' fill-rates, which means more advertisers get to meet their objectives and publishers can earn more ad revenue.



Mid earning ad networks compete in a separate waterfall for the ad placements after the first.



Low earning ad networks compete in a separate waterfall with a high frequency cap for the leftover impressions.

APPODEAL

INTRODUCTION OF AD PLACEMENTS & FREQUENCY CAPS

Different tiers of ad networks are positioned in separate tiers of waterfalls that more optimally match the value of the different ad placements.

Frequency caps can raise the value of the first fill ad placement for both advertisers and publishers.

New higher eCPM ads can still be held back in the waterfall if their ad network's historical performance does not qualify them for first fill positions.

Still no breakdown of performance by impression to see whether an impression was wasted or not.

Reliance on an ad network's historical performance is still an inaccurate indicator of its actual performance.

APPODEAL

3rd Model

INTRODUCTION OF STATIC PRICE FLOORS

APPODEAL

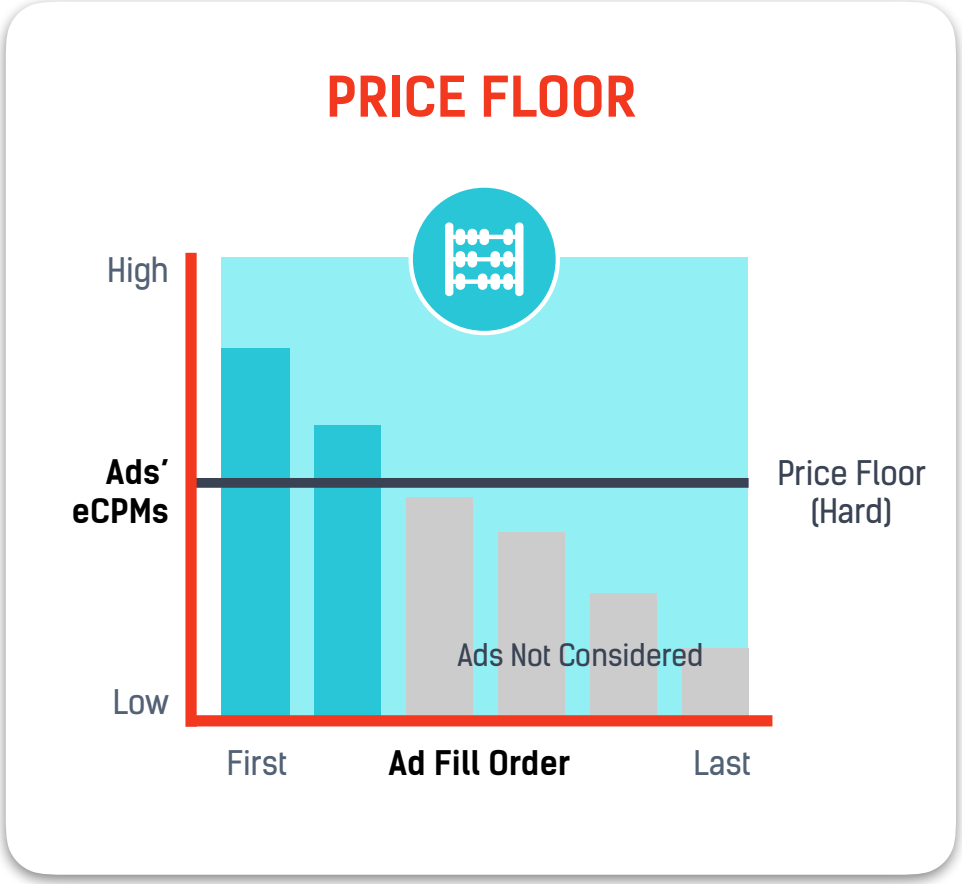
INTRODUCTION OF STATIC PRICE FLOORS

While the introduction of ad placements and frequency caps improved on the Traditional Waterfall model, the issue of relying on an ad network's historical performance's inaccurate nature remains. Hence, some ad networks began letting publishers establish Price Floors, which some ad mediation platforms also began adopting.

A (hard) **Price Floor** is the minimum bid an ad placement is willing to consider for an ad to be served. For example, if the price floor for an ad placement is $7 eCPM, only bids over $7 eCPM will be considered. Any bids below $7 will be skipped over.

With price floor settings, publishers no longer need to rely on just an ad network's historical performance data to set up a waterfall.

Instead, it incentivizes ad networks to be more specific about the value they are willing to bid for an impression that targets specific types of users.



Ad bids below the (hard) price floor are not considered in the waterfall for the ad placement.

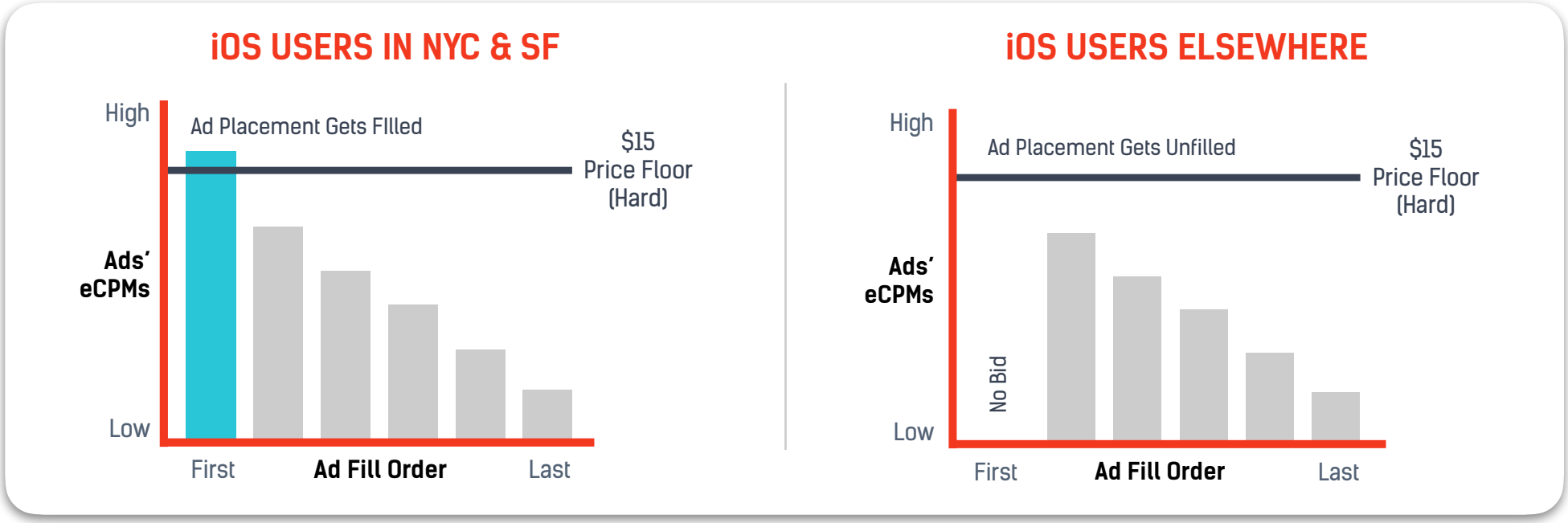
INTRODUCTION OF STATIC PRICE FLOORS

For ad networks, the introduction of price floors has two main advantages in the ad mediation arena:

1. Ad networks are empowered to decide beyond whether to fill an ad impression or not. They can now decide whether to pay a certain amount or not.

For example, a publisher sets a price floor of $15 eCPM for its first ad placement for iOS users in the United States. The ad network has an ad campaign that can meet that price floor but only for targeting iOS users in San Francisco and New York City.

As a result, the ad network decides to fill that ad placement at $15 eCPM ONLY when it targets the intended audience in those two cities.



Ad network decides to bid the price floor of $15 eCPM only when it targets iOS users in New York City and San Francisco.

INTRODUCTION OF STATIC PRICE FLOORS

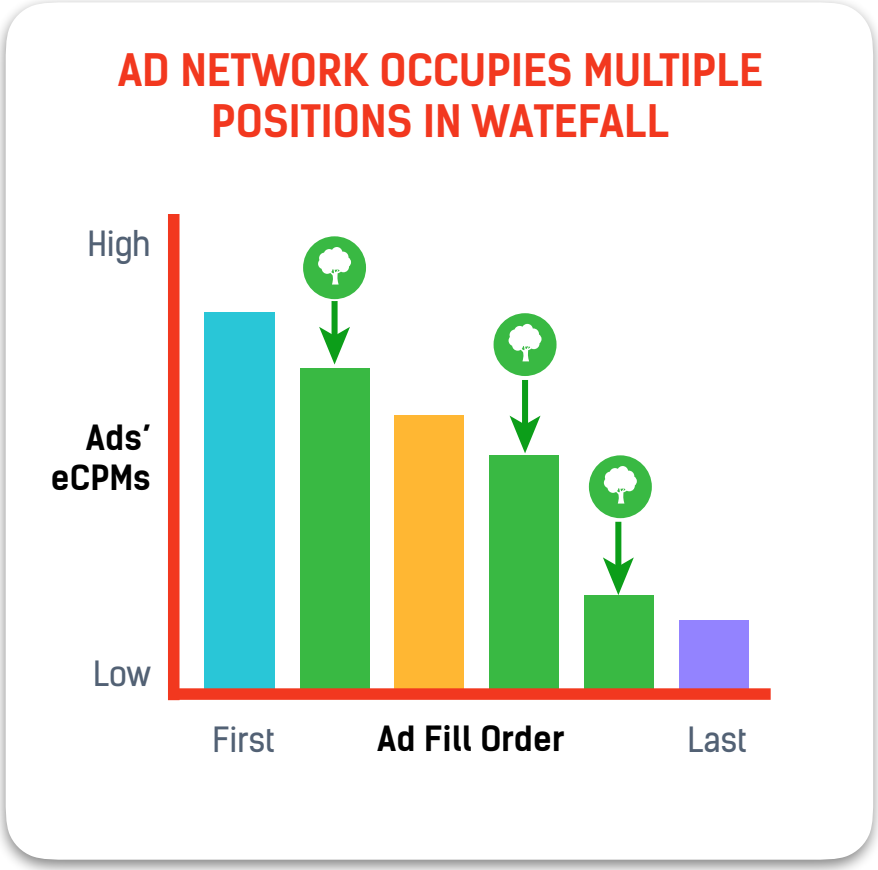
2. Ad networks can now occupy multiple positions in the waterfall.

Consider this example:

Three ad networks that only rely on historical performance each has an ad campaign for an ad placement:
$9.35 eCPM (Abacus)
$6.70 eCPM (Ceres)
$1.74 eCPM (Rocket)

Ad Network "Botany" however accepts price floors and has the following ad campaigns:
$7 eCPM
$5 eCPM
$2 eCPM

In the traditional waterfall model, "Botany"s ads would not be served until after "Abacus"' ad campaigns were run, given its lower position in the waterfall. However, ad mediation platforms that accept price floors would form the waterfall as follows instead:
$9.35 eCPM (Abacus)
$7 eCPM (Botany)
$6.70 eCPM (Ceres)
$5 eCPM (Botany)
$2 eCPM (Botany)
$1.74 eCPM (Rocket)



By accepting price floors, ad network Botany can fill multiple positions within the waterfall and penetrate ad fills occupied by another ad network.

INTRODUCTION OF STATIC PRICE FLOORS

Ad networks can compete with other ad networks on the ad bid level and occupy multiple positions in a waterfall by accepting price floors. They are no longer constrained by their waterfall position based on their historical performance.

Ad networks can decide whether to pay a certain amount or not based on the value of the target audience. They are no longer limited to deciding whether to fill an ad impression or not.

Inflating ad bids can cause inefficiencies. Ad networks could put out multiple bids that dominate the attractive parts of the waterfall but also inflate the cost of those bids by making them compete among themselves when other ad networks are not competing at the same bid levels.

The performance of an app can be slowed down due to too many client-side requests from attempts to dominate the steps in the waterfall.

AD MEDIATION'S PRICE FLOOR AND RTB MARKETPLACES?

What makes the introduction of price floors especially significant is that it blurs the gap between ad networks and actual RTB (real-time bidding) marketplaces - and ad networks essentially begin to function as DSPs (demand-side platforms) - within the ad mediation arena.

However, there are two key differences between ad mediation that accepts price floors and an actual RTB marketplace.

1 Ad Mediators Accept Soft Price Floors

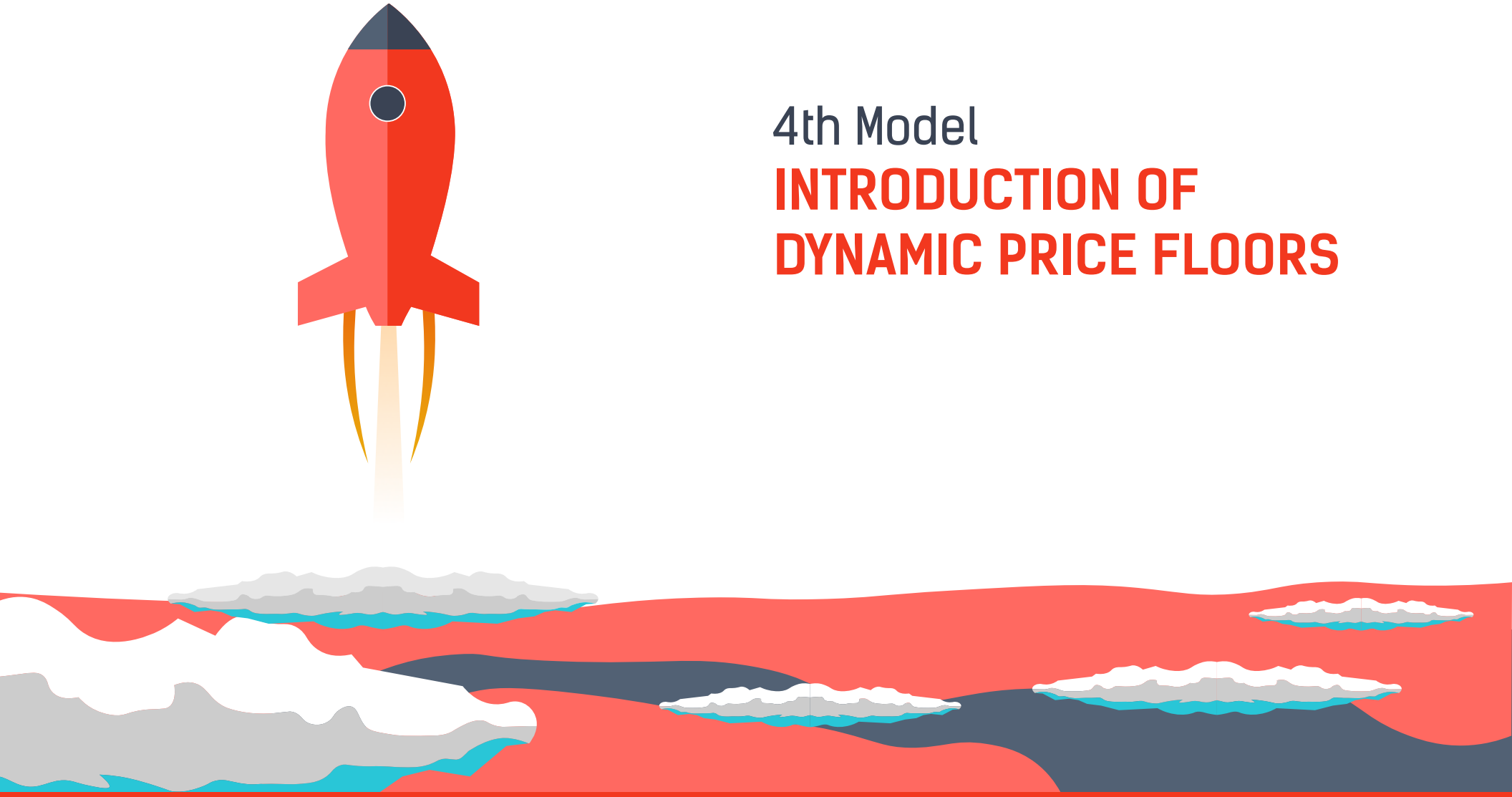
Unlike RTB marketplaces, which only serve ads on a CPM basis, ad mediators can accept both soft and hard price floors. While hard price floor is the absolute minimum an ad bid must be above to be considered, a **Soft Price Floor** is more of an *estimated* minimum eCPM for an ad placement, which ad networks are not strictly required to match.

Ad networks that use soft price floor can therefore submit a **Soft Bid**, or an estimated bid, to enter the waterfall. If the ad network's soft bid turns out to deviate significantly from its actual eCPM, over time, the ad mediator will take that analysis into consideration for its position in the waterfall.

2 Ad Mediators Assess Historical Performance

Ad mediators still need to analyze ad networks' historical performance to determine their soft price floors and positions in the waterfall.

RTB marketplaces, on the other hand, have no need to assess historical performance since the bids are done in real-time. Also, since all RTB ads are CPM based and not CPI, all price floors are considered hard, which means the clearing bid equals the second-highest bid.



4th Model

INTRODUCTION OF DYNAMIC PRICE FLOORS

APPODEAL

INTRODUCTION OF DYNAMIC PRICE FLOORS

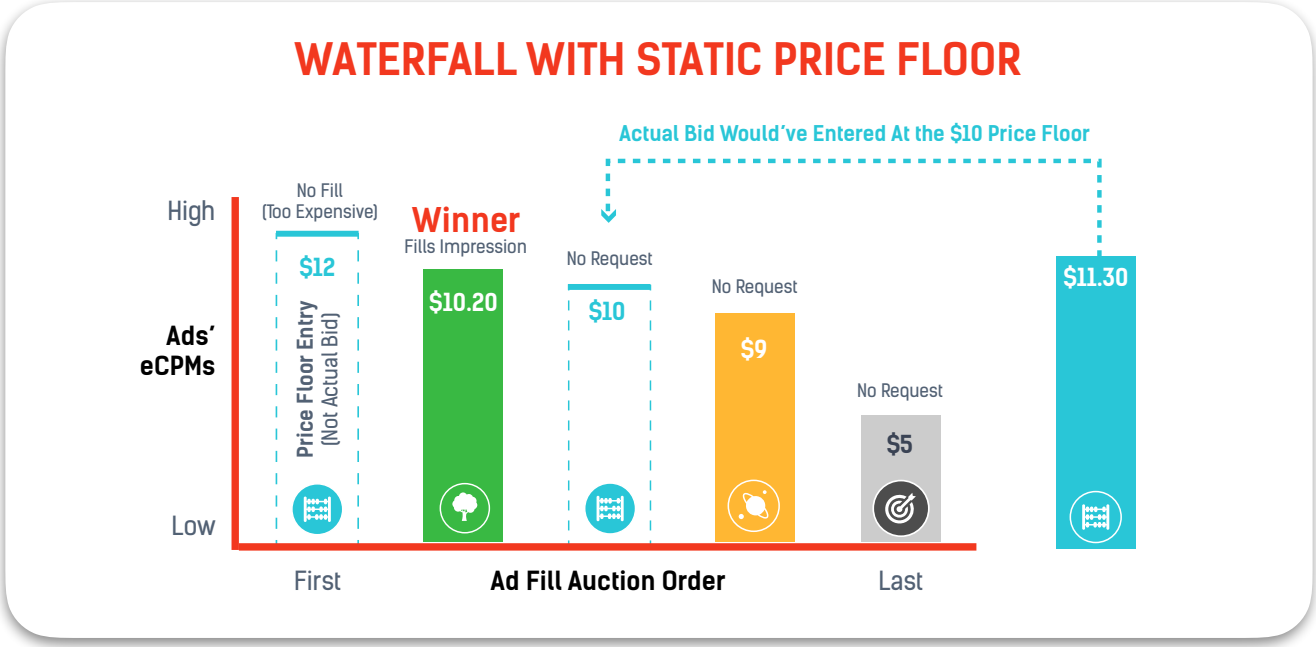
Due to the issues of inefficient ad bids and numerous client-side requests with Price Floors, some ad networks introduced the concept of Dynamic Price Floors to address them.

Unlike regular price floors, a **Dynamic Price Floor** bid changes in response to what the potential closing ad bid is by bidding $0.01 above that amount. The result? The dynamic price floor bid wins the ad impression.

For example, let's take a look at ad network Abacus entering a waterfall with the following static price floors for a first fill placement: $12 eCPM and $10 eCPM.

However, Abacus' advertiser's bid is $11.30, which is too low to fill the price floor at $12.

Furthermore, another ad network "Botany" enters the waterfall with a historical performance of $10.20 eCPM, which is higher than Abacus' price floor of $10, beating it for that impression.



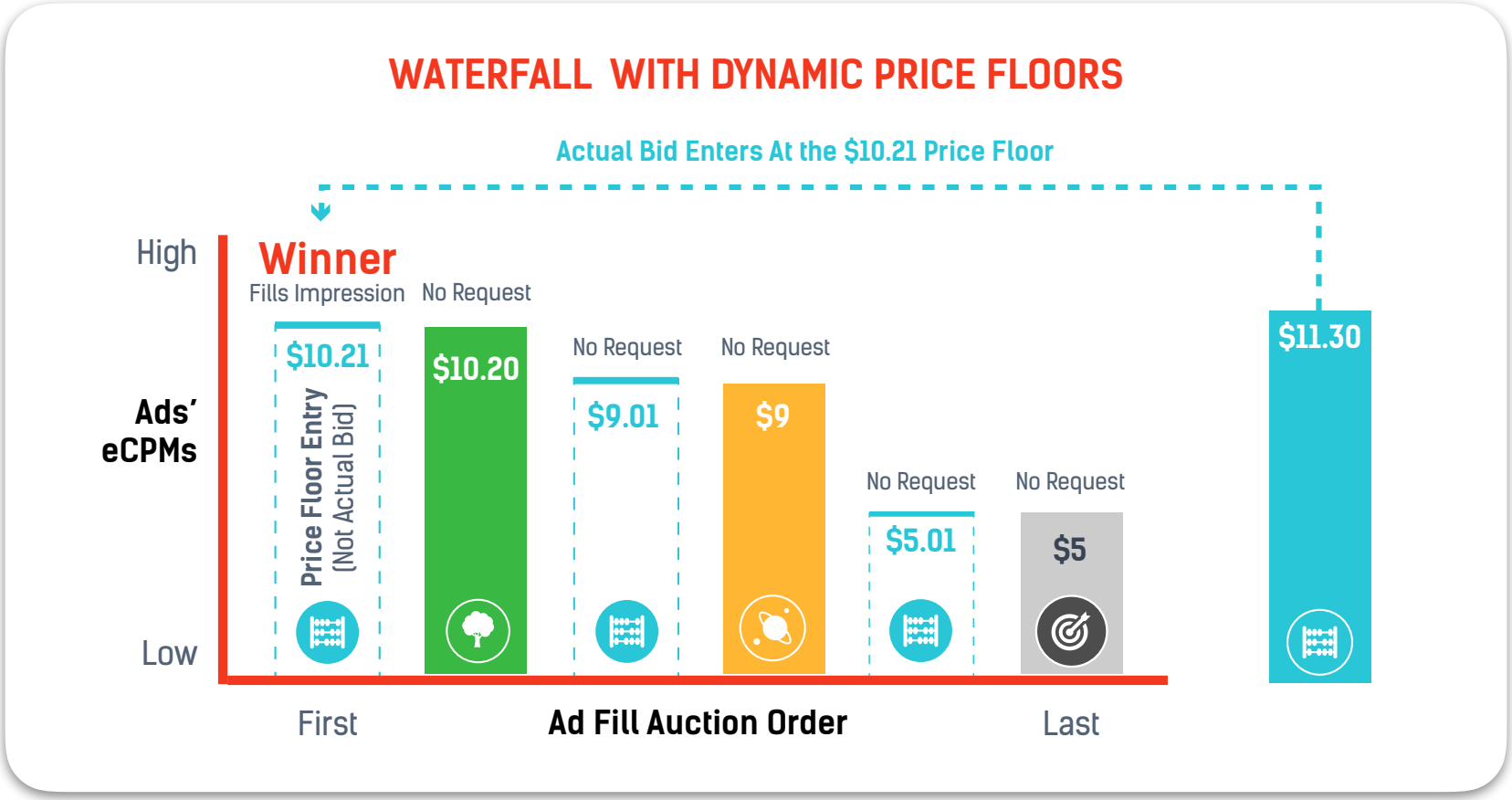
With static price floors, ad network Abacus loses the bid even though its actual ad bid of $11.30 is the highest because it's not high enough for the $12 price floor entry and the $10 price floor entry is behind a waterfall entry of $10.20.

APPODEAL

INTRODUCTION OF DYNAMIC PRICE FLOORS

If Abacus used dynamic price floors, however, it would have won the first fill impression at $10.21 since its price floor would always be $0.01 above the historical performance of other ad networks in the waterfall.

Moreover, with dynamic price floors, Abacus' average price floor is decreased to access the same impression.



With dynamic price floors, ad network Abacus wins the bid because its price floor entries are dynamically set at $0.01 above the waterfall entries from all the other ad networks.

APPODEAL

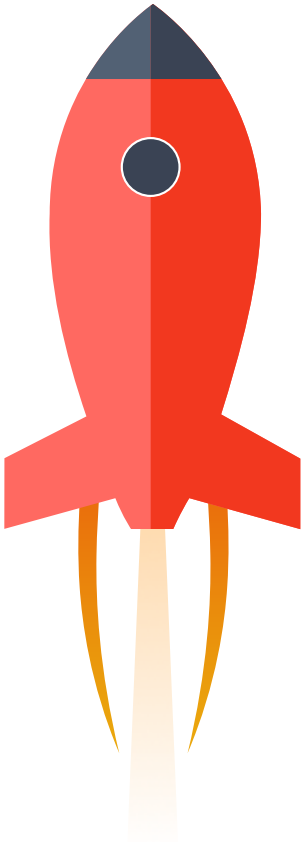
INTRODUCTION OF DYNAMIC PRICE FLOORS

Ad networks that use dynamic price floors will usually win the ad impression. Within the ad mediation arena, ad networks that don't use dynamic price floors are at a serious disadvantage when it comes to winning ad impressions as their bids will always be $0.01 below those that use dynamic price floors.

With dynamic price floors, an ad network's average price floor is decreased to access the same impression.

The auction for ad impressions becomes more competitive where the top winning bid ends up being closer to what the advertiser is willing to pay for the impression as more ad networks adopt dynamic price floors. This effect is akin to shifting from a second-price auction model to a first-price auction model but the mechanic still works as if it's in the second-price model.

A more competitive auction also means that device performance slowdown remains an issue.



The New BIG Model
SOFT HEADER BIDDING

SOFT HEADER BIDDING

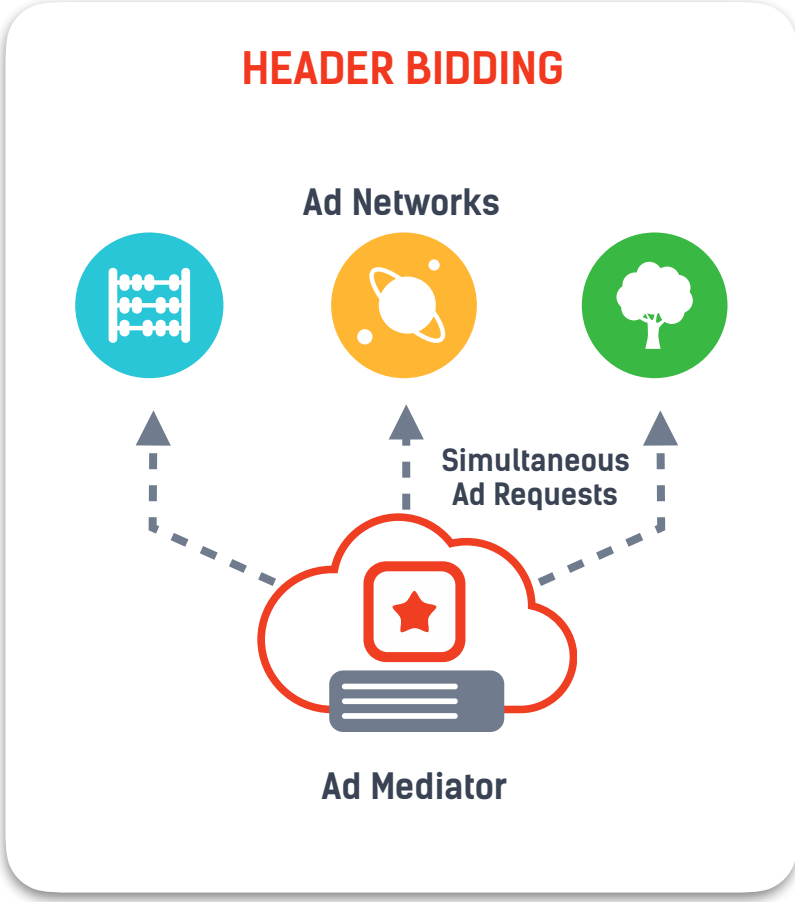
What would happen if all ad networks adopted dynamic price floors though?

After all, ad networks can't all dynamically outbid the top bid by $0.01 to win an impression since only one can occupy an ad impression.

This is where innovation in ad mediation is happening now with the introduction of soft header bidding to dynamic price floors.

Unlike the previous models, where the waterfall requests are sent consecutively to ad demand sources, one by one, **Header Bidding** sends the ad requests to the ad demand sources simultaneously. An OpenRTB auction then takes place on the ad mediator's server side.

The way soft header bidding works with dynamic price floors is that it enables ad networks to not only choose to fill or not fill a certain price floor, but also to report the estimated value of the impression.



Unlike previous models, header bidding does not use a waterfall to request ads one by one anymore. Instead, ad requests are sent to the ad demand sources simultaneously.

Keep in mind that while the process of ad mediation using price floors is similar to an actual RTB, they are still different in that ad mediators operate with "soft bids." Also, its billing is still CPI based, and no CPM is required.

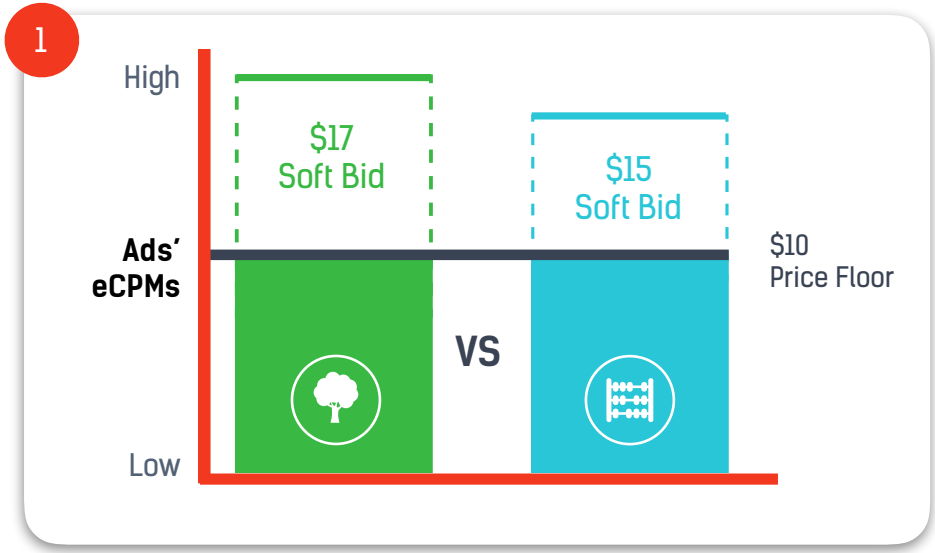
How Soft Header Bidding Works

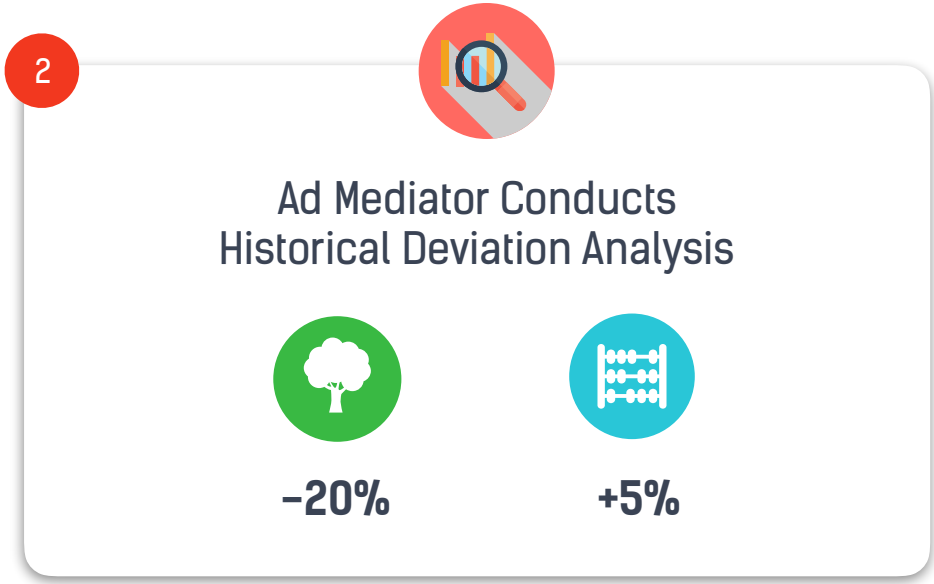
1. Two ad networks, Abacus and Botany, simultaneously choose to fill the same price floor of $10.

Abacus: $10 price floor with soft bid of $15
Botany: $10 price floor with soft bid of $17

2. Ad mediators apply historical performance analysis to evaluate which ad network would actually yield with a higher bid, since soft bids are not actual bids.

In step 2, because most ad networks would likely submit soft dynamic price floor bids rather than hard dynamic bids, ad mediators have to assess their historical deviation of eCPM to determine which bid would yield higher. In the cases where two or more ad networks submit the same hard dynamic price floor or have the same historical deviation, the ad impression would be given to the one that can fill it faster.





APPODEAL

SOFT HEADER BIDDING

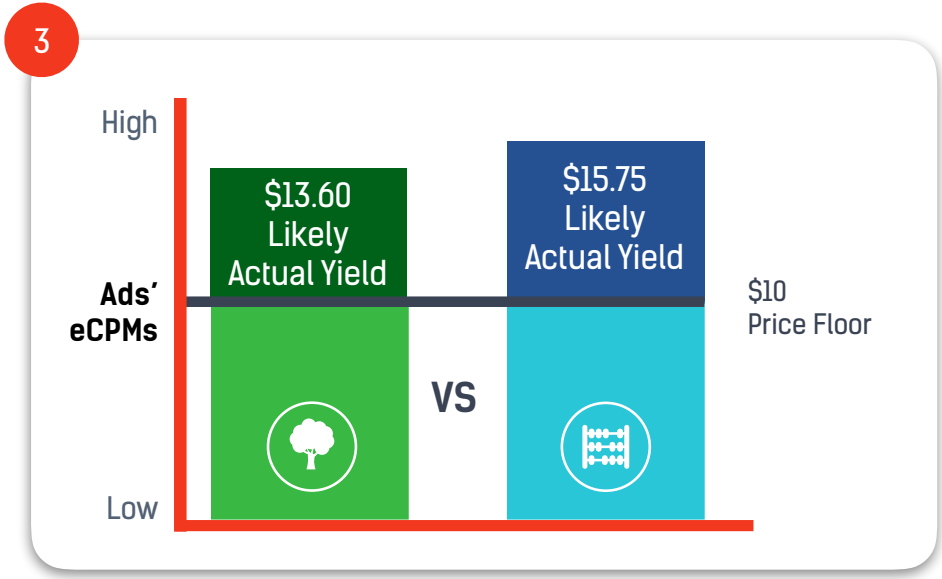
3. Ad mediator compares the ad networks' likely actual yields:

Abacus: Soft bid $15 → Historical deviation +5% = likely actual yield $15.75

Botany: Soft bid $17 → Historical deviation -20% = likely actual yield $13.60

4. Result: Abacus wins the impression with its soft bid of $15 because its likely actual yield is higher than Botany's.

As you can see, with soft header bidding, ad networks can be more aggressive and competitive in winning an impression, yet not overbid based on what other networks bid.



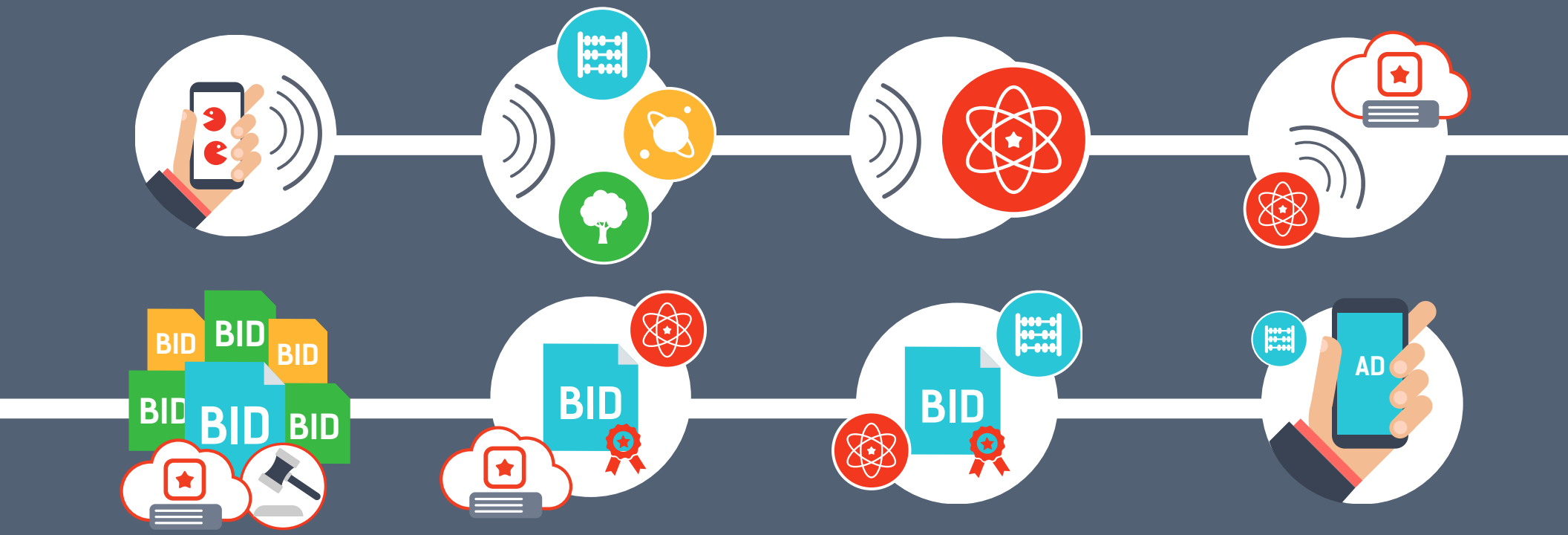
SOFT HEADER BIDDING

- **No more waterfalls.** Ad requests are sent out simultaneously to ad demand sources and an OpenRTB auction takes place on the ad mediator's server side.
- **Efficient and fair bidding.** Ad networks can be more aggressive and competitive in winning an impression yet not overbid based on what other networks bid.
- **No more device performance issues.** Since ad requests and the auctions are done simultaneously on the server side, devices no longer need to run consecutive client-side ad requests.

SOFT HEADER BIDDING IN MOBILE APP SPECIFICATION

HEADER BIDDING WORKFLOW

1. User Opens App
2. All Ad Network SDKs are Activated
3. Ad Mediation SDK is Activated
4. Ad Mediation SDK Sends Request to Ad Mediation Server



5. Ad Mediation Server Conducts an OpenRTB Auction and Accepts Soft or Hard Bids from Ad Networks
6. Ad Mediation Server Selects Winning Bid and Reports It Back to Ad Mediation SDK
7. Ad Mediation SDK Requests Winning Ad Network SDK to Cache the Ad
8. Winning Ad Gets Displayed

APPODEAL

In order for the soft header bidding to be implemented, it has to be done on the server-side. An ad network's SDK still remains within the publisher's app and gets activated when its soft bid wins the ad impression.

For ad mediators to execute soft header bidding effectively, ad networks must provide a server-to-server API that would accept all the information collected by its SDK about the user.

The API should then return either an estimated value of the impression or a real-time bid. If it's the estimated value, ad mediators would apply a historical deviation analysis. Unlike with actual RTBs, such a transaction does NOT have to be CPM based. API has to be OpenRTB 2.3 compliant.

Finally, it is at this stage where device slowdown due to ad requests is no longer a problem, because ad mediators do not have to activate the ad network SDKs and send requests one by one. Instead, they only send one request to the server, which sends simultaneous requests to the ad network APIs. They then report only the winning ad back to the ad mediation SDK, which then activates the winning ad network's SDK.

AD NETWORK'S SERVER-TO-SERVER API CHECKLIST

- ✓ Accepts all information collected by its SDK about user
- ✓ Returns estimated value of impression or a real-time bid
- ✓ OpenRTB 2.3 compliant

The ad mediation SDK can and should be activated upon the app's launch to pass along all the necessary information about the device to the ad networks. The actual request to cache an ad itself will only be sent when the winner of the auction is determined by the server.

RECOMMENDATIONS FOR AD NETWORKS

As we've just explored how ad mediation models have evolved and become more sophisticated in only the last two years, now is the right time for ad networks to adapt in order to remain competitive within the ad mediation arena.

There are two possible paths for ad networks to take:

PATH ONE

Stay CPI Based and Implement:

A server-to-server OpenRTB compliant API that will enable ad mediators to request the **estimated value** of the impression.

PATH TWO

Evolve to CPM Based and Implement:

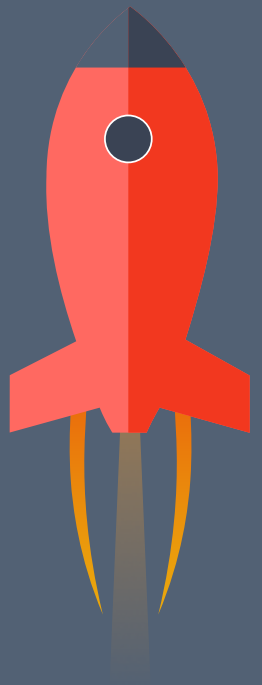
VAST/MRAID/OpenRTB that already supports ad placements, dynamic price floors, and server-to-server integrations.

By moving forward with one of these paths, not only will ad networks be more competitive in the ad mediation arena, it also sets them up for the upcoming model in ad mediation: True Header Bidding.

TRUE HEADER BIDDING

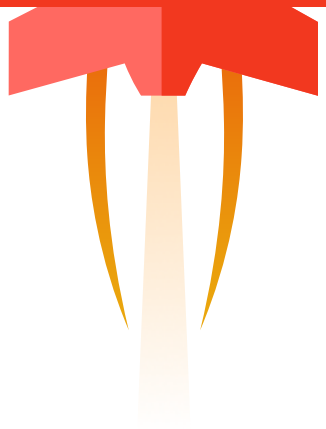
True header bidding would be very similar to soft header bidding except it would require ad networks to evolve into DSPs and operate with hard price floors, hard bids and CPM billing.

Header bidding has existed for quite some time for desktop. As its name implies, the desktop version executes pre-bidding in the website's header. Since mobile apps do not have headers, the same effect of pre-bidding would have to be implemented on the ad mediation SDK side - which Appodeal does. The ad mediation SDK then sends requests to its server, which then sends simultaneous requests over to OpenRTB and DSP bidders, as well as non-programmatic ad network APIs, and returns the winner of the auction to the SDK.



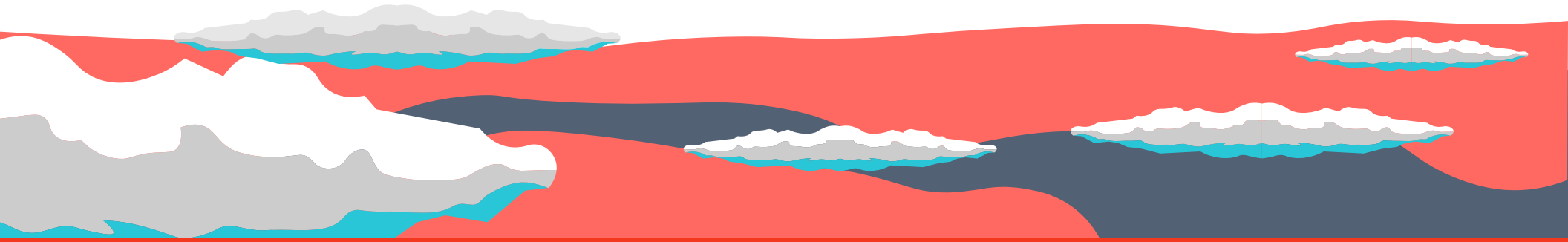
Unlike desktop header bidding, DSPs can pass the ad creative with the first response with no need to break this process into two separate requests. It's only necessary on desktop because the <head> blocks the whole page from loading, so it needs to be executed as quickly as possible. On mobile apps, however, the actual caching of an ad is a non-blocking process and can be executed at any time. Ad networks that work over SDK, though, would need to break down impression estimates and actual creative delivery into two parts: server-side and client-side.

The advantage of true header bidding is that it finally does not rely on an ad network's historical performance, which tends to not be very accurate. However, the soft header bidding model's reliance on it does deliver a much more accurate outcome than those from earlier, more traditional and basic models.



Have Questions on
How to Implement Soft Header Bidding?

REACH US AT HI@APPODEAL.COM



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