

Maximising Programmatic Inventory Utilisation

With an opportunity to increase revenue and yield, Clear Channel and Sahaj Software built an MVP implementing Waterfall and Header Bidding strategies, which resulted in significantly increasing ad fulfilment rates and operational efficiencies.



US-based Clear Channel Outdoor Holdings, Inc. is a global outdoor advertising company, specialising in Out-Of-Home (OOH) advertising, which involves displaying advertisements in public spaces—primarily outdoors—where they are visible to people as they navigate through the urban environment. These advertisements are placed on various types of media, including billboards, transit locations such as subways, airport advertising, and street furniture like bus shelters and signages. Their digital offerings enable brands to utilise real-time, engaging content across high-tech screens, while their traditional formats allow for large-scale, impactful advertising on printed billboards. The company's extensive network of prime advertising locations in urban and suburban environments helps businesses reach broad and diverse audiences effectively. The company operates across several geographies, including the UK and Europe, offering a range of both digital and traditional advertising solutions. Clear Channel's media assets consist of both digital and non-digital frames. Digital frames refer

to advertisements displayed on electronic screens, where the content can be dynamic and updated in real-time. Non-digital frames, often referred to as classic or traditional formats, involve static ads printed on materials like paper or vinyl.

Business Challenge

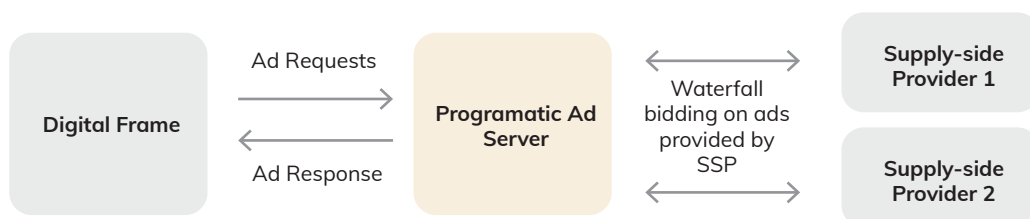
Programmatic buying of advertising is very common in the "online" world but was relatively new for OOH when this initiative launched. Programmatic offers a new channel to market for OOH media owners providing them the opportunity to access new advertisers, agencies, and budgets to drive revenue growth. In essence, Programmatic enables the real-time bidding and fulfilment of advertising. This enables buyers to deliver targeted campaigns that can be driven by data, context, and triggers to achieve impact and ROI. Clear Channel works with a number of programmatic partners, Supply-Side Platforms (SSPs), to access programmatic demand. They wanted to improve their ability to drive yield and revenue by providing inventory to all of these partners in a fair and consistent way.

The Solution

When Sahaj Software onboarded as a strategic partner, we worked with Clear Channel to introduce a new solution to allow multiple SSPs to trade programmatically:

1 A Minimum Viable Product (MVP)

Rather than trying to launch a solution that addressed every conceivable use case, we worked with the Clear Channel team to develop an MVP, which we used to prove value and to continue building iteratively on top of.



2 Waterfall Bidding

To maximise the amount of revenue generated from each available advertising space we worked with Clear Channel to introduce waterfall bidding. At that point in time, Clear Channel had two SSP partners sharing ad space equally. To counter a low response rate, the initial solution focused on establishing effective patterns for

sourcing advertisements from both SSPs and delivering them to digital frames. To manage the differing rates of ad fulfilment between the two SSPs, we introduced a method, which operates by sequentially calling each SSP in a predetermined order. While this approach is functional, it could benefit from enhancements that foster greater competition among SSPs, ultimately maximising fill rates and CPMs.

3 Lambda function as the backend

In order to reduce the complexity of deployment and operational maintenance, we used a single Lambda function as the backend, with path-based routing and a local SQLite database, avoiding database connection issues. Additionally, this gave us the benefit of the entire codebase being unit testable, (the Lambda is just a function, so it can be unit tested) and if it worked in a developer's machine it was guaranteed to work in production.

- a. This involved exposing operations like local file reads, database queries, and network requests in a unit-testable way as dependencies (inputs) to a function. This MVP was delivered in just four weeks, complete with testing on the client's test players and a 10-second rollback mechanism.

4 Revenue Optimisation by Header Bidding Implementation

Once we validated the technical approach with the simpler Waterfall Bidding, we looked to introduce Header Bidding to allow higher paying ads to win the bid in each auction cycle.

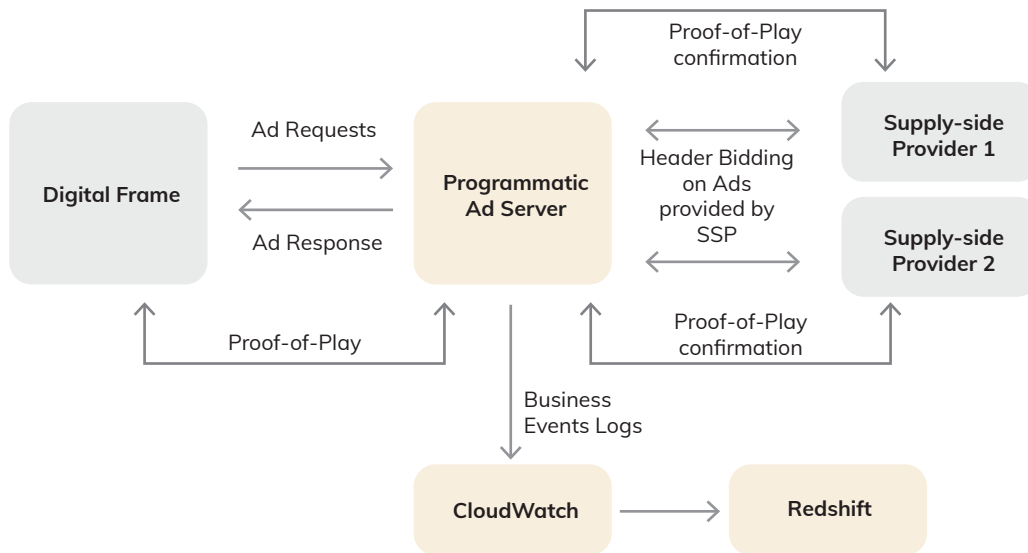
- a. Header Bidding fetches ads from each integrated SSP in parallel. It then does a comparison on each advertisement provided, selecting a winner based on the highest potential revenue.

- b. We used CPM (Cost Per Mille, i.e. cost per thousand impressions) to determine the winner of the bidding process, as revenue is an outcome of CPM multiplied by the number of impressions, which should be the same for a given frame across SSPs.

- c. In order to build confidence and data on whether the approach worked as expected, we did a gradual rollout on specific frames.

5 Improved Observability

Recent advancements in monitoring and observability have significantly transformed how media owners assess the value of ad placements. Historically, the final metrics were largely influenced by external sources, leading to challenges in validation. To overcome this, we collaborated with ClearChannel to co-create a system that strengthens the ability to track key events related to ad interactions and supports proactive monitoring. This innovation ensured optimal performance, effective ad delivery, and quick issue resolution.



Impact

In the UK, the first market for release, the impact of these changes was significant, as depicted in the following data:

- We saw a dramatic increase in all programmatic requests receiving a revenue-generating ad.
- Additionally, there was a significant increase in daily CPM, again in the UK, spread across all integrated SSPs.
- The solution also improved operational efficiency. The turnaround time for adding an additional region to the platform was reduced from 4-6 weeks to just two weeks.
- Similarly, integrating a new programmatic platform now takes only 3-4 weeks, down from 1.5-2 months.