influxdata®

Monitoring a High Scale Bidder-as-a-Service (BaaS) Using InfluxDB Enterprise

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BEESWAX

Company in brief

Founded in New York by a team of former Google and DoubleClick advertising leaders, Beeswax is pioneering the industry's first Bidder-as-a-Service™ ("BaaS").

Powered by Beeswax's Bidder-as-a-Service™, the Beeswax Programmatic Cloud™ allows users to combine and customize best-in-breed technologies from the programmatic ecosystem.
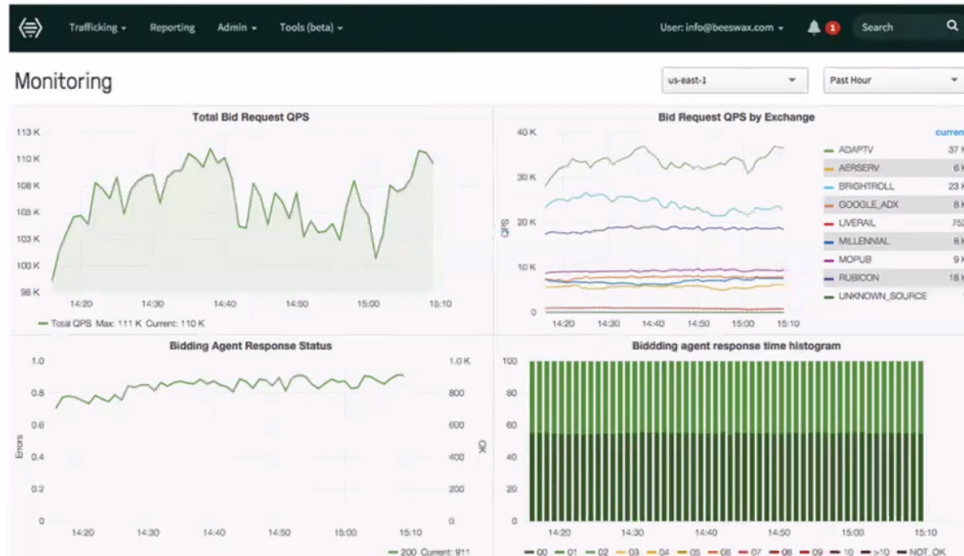
The Beeswax Programmatic Cloud™ is a DSP designed specifically for the unique needs of each client's business. It offers sophisticated advertisers the ability to combine and customize best-in-breed solutions into a seamless whole, without having to create their own software code, or employing their own team of engineers.

Case overview

Beeswax needed to bypass the opacity, lack of customization, and other restrictions of traditional Demand-Side Platforms (DSP's) for its customers while providing a cost-effective solution that does not require the high expenses of building your own bidder.

While marketers around the world are pouring a tremendous amount of money into AdTech, they are demanding real-time visibility into their ad spend. Beeswax uses InfluxDB to collect metrics and events to support the 1 million queries per second performance of its AdTech platform and to collect and display metrics to customers in real-time on their behalf.

Using InfluxDB Enterprise, Beeswax was able to offer customers a completely customizable Real-Time-Bidder (RTB) solution for a low, flat, monthly fee, that provides secure real-time visibility into their campaigns and performance, and thereby created the first Bidder-As-A-Service™.

Beeswax's custom UI monitors bidding metrics in real time, providing more visibility and new algorithm customization opportunities.
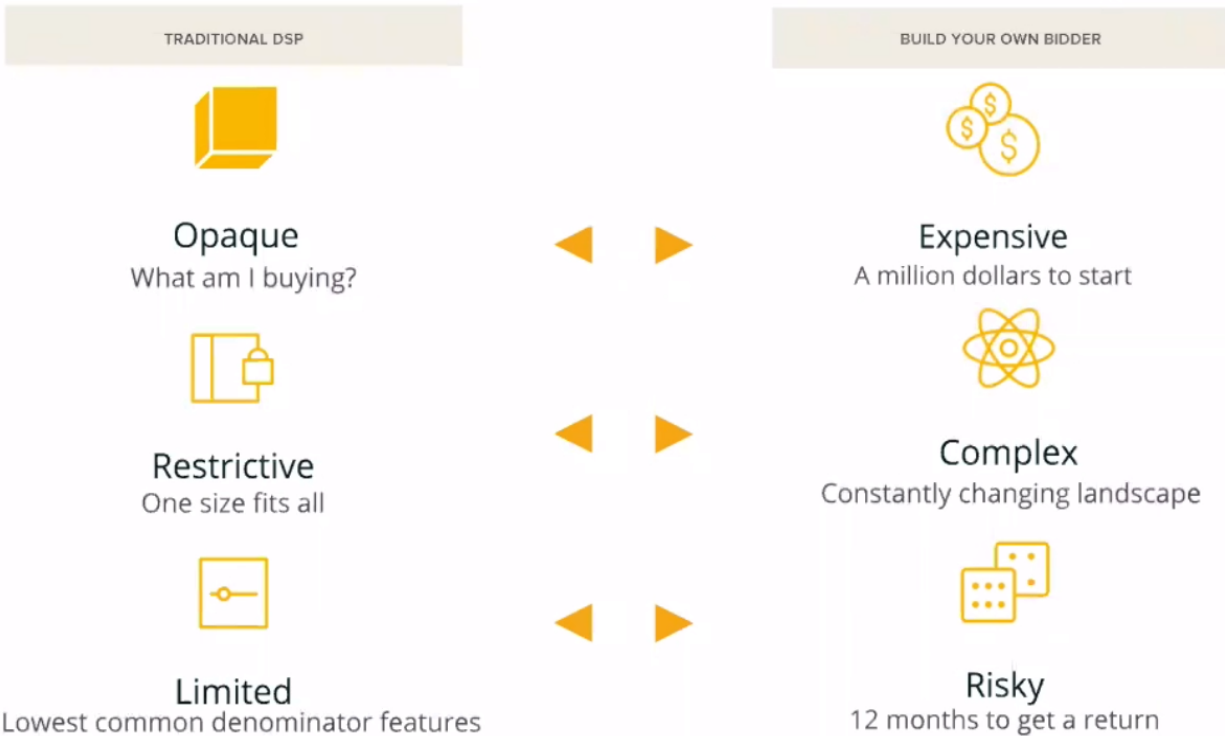
> *"The options that were available to our customers were basically these two: You could use a traditional out-of-the-box DSP, or you could build your own bidder."*
>
> **Ram Kumar Rengaswamy,** *co-founder and CTO*

The business problem

Programmatic digital advertising remains an exciting and innovative arena, and the smartest buyers require technically-sophisticated, highly customizable solutions. Beeswax believes that using an RTB bidder should be as easy as using any part of the marketing cloud.

Beeswax's business challenge was to provide an attractive alternative to the difficult tradeoff facing advertisers. Advertisers seeking to use a bidder in their advertising strategy had to pick either a Traditional DSP (such as that offered by MediaMath, Google, AppNexus, Trade Desk) or they could build their own bidder. These two existing options have major disadvantages, shown in the figure below, that hinder advertisers from realizing their potential:

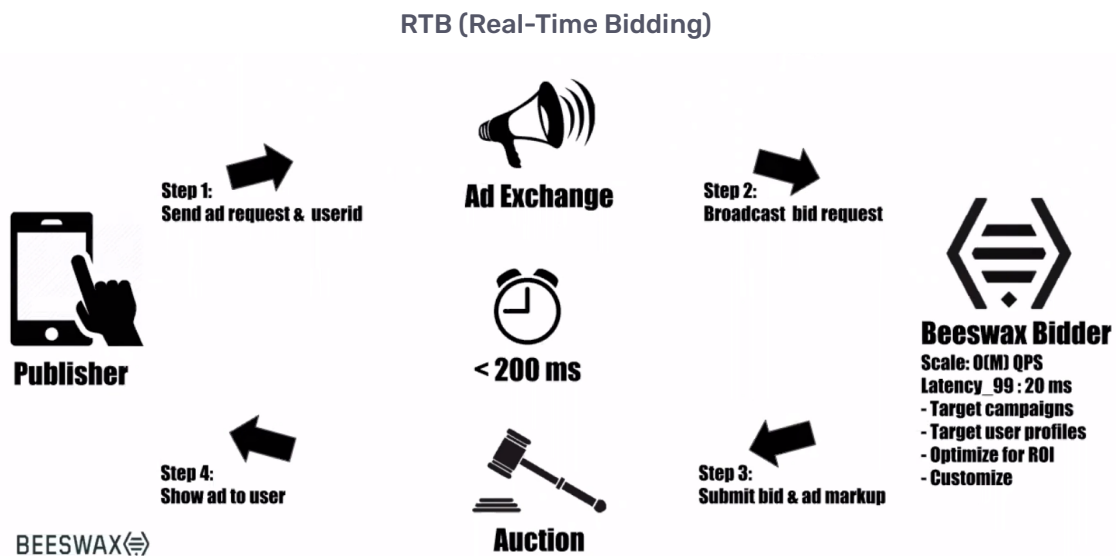|	TRADITIONAL DSP			BUILD YOUR OWN BIDDER
	Opaque What am I buying?	◀ ▶		**Expensive** A million dollars to start
	Restrictive One size fits all	◀ ▶		**Complex** Constantly changing landscape
	Limited Lowest common denominator features	◀ ▶		**Risky** 12 months to get a return

Beeswax wanted to offer advertisers an alternative platform that would offer real-time bidder-as-a-service, and that would bypass the drawbacks of either existing option. Beeswax needed to create a Programmatic Cloud that provides data transparency, flexibility (through APIs), and complete control so that customers could own their own roadmap. Beeswax also needed its Bidder-as-a-Service to be affordable, simple, and reliable.

Technical journey

"We just accidentally stumbled on it [InfluxDB]. And then we started looking at the different features it offered. And it was so much better in terms of what existed out there."

Real-time bidding is a very high-scale process because the Queries Per Second (QPS) coming into the system are of the order of millions. Real-time bidding is also a very high-performance process because it takes only 200 milliseconds. Here's how real-time bidding works:

- Exchanges bring together buyers (publishers) and sellers (advertisers).
- When someone visits a website or uses a mobile app, the site or app sends an ad request to the exchange, which will contain some information about the context where the user is, including their user ID.
- The exchange will collect this information and broadcast that over the internet in the form of a BidRequest.
- Bidders (a piece of software deployed on behalf of advertisers to optimize their campaigns) listen for these BidRequests over the internet.
- The bidder receives the BidRequest, calculates a bid price, and the actual creative of the ad returns that information back to the exchange.
- The exchange waits until it receives the BidResponse from all the bidders that it sent the BidRequest to, runs a second price auction, picks a winner, and the winner's ad is shown to the user.
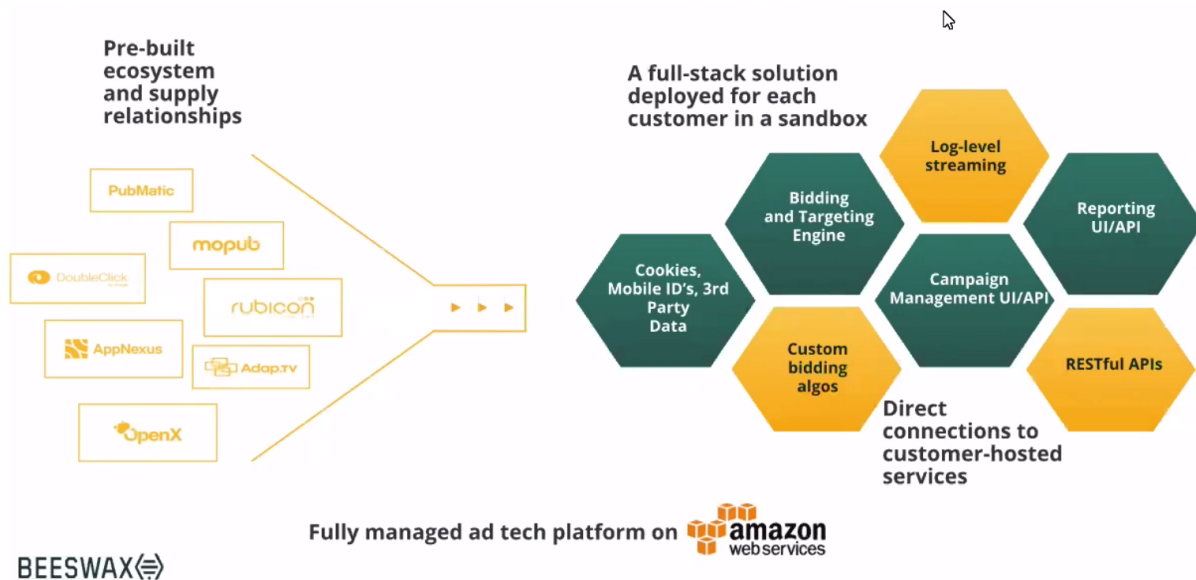
RTB (Real-Time Bidding)

To enable real-time bidding-as-a-service, Beeswax realized the value of having a truly robust time series platform. They considered Graphite but found its data modeling to be very limiting and chose InfluxDB instead.

Providing business value

Beeswax offers advertisers an alternative where the bidder is provided as a fully managed cloud-based service built and deployed on AWS. Beeswax has done the hard part of pre-building all the supply integrations and data integrations necessary for a bidder to be successful.

Beeswax First Product: Bidder-As-A-Service™

Why InfluxDB?

> *"One of the first things that attracted us to InfluxDB was that it had this data model that was built around databases and that there was some sort of access control for each database."*

One of the key problems Beeswax solves for its customers is the fact that it operates the systems for customers on their behalf. This is where InfluxDB plays a critical role in the overall system architecture of Beeswax.

Why InfluxDB Enterprise?

> *"One of the first things that attracted us to InfluxDB was that it had this data model that was built around databases and that there was some sort of access control for each database."*

Beeswax chose InfluxDB Enterprise because of the High Availability features that it provides. Because the metrics stored in InfluxDB are critical for Beeswax to ensure its systems and its customers' systems are working correctly, the Beeswax team decided early on that higher availability is not something to compromise on, and therefore, deployed Enterprise versions of the InfluxDB cluster in three world regions.

Technical architecture

Global InfluxDB Deployment at Beeswax

Using InfluxDB for performance monitoring and custom dashboarding

Not only does Beeswax use InfluxDB to collect and store metrics that ensure that its systems are working correctly, but it also provides a custom dashboard where its customers can view how their software is performing on top of the Beeswax system. Beeswax does this by collecting metrics on behalf of its customers and exposing them through this UI. Here's how, through InfluxDB Enterprise, Kapacitor and Grafana, Beeswax was able to set up a separate data source for each customer.

- Each Beeswax customer has a separate database.
- Data is written into the database, then, via Continuous Queries (CQ's), the data is filtered out based on the customer and then written into the customer's specific database.
- Each database has its own data source in Grafana, and therefore, only customers of that data source can access its own data source.
- Customers access a single Beeswax UI to see all service activity including system performance metrics collecting from the Beeswax system as well as the customers' systems.
- Kapacitor makes copies of the metrics as they are streamed in from different regions into a centralized InfluxDB instance to help ensure no data is lost.
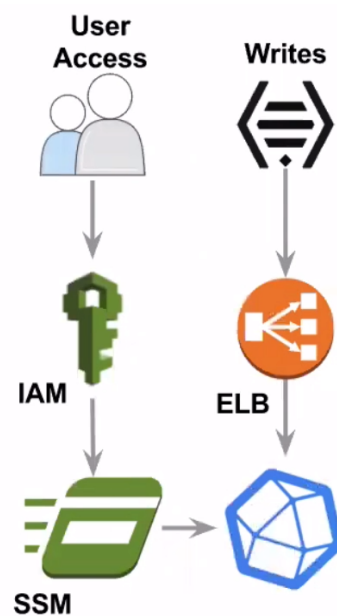

How Beeswax optimized the InfluxDB deployment for AWS

First, the Beeswax team deployed InfluxDB on EC2 autoscale groups because that allows them to flexibly scale out the service in case they run short on resources like memory or disk space:

- The reads and the writes into this autoscale group on which InfluxDB runs are fronted by Amazon Elastic Load Balancer (ELB).
- The ELB acts like a meta-monitoring system for InfluxDB clusters.
- InfluxDB commands are executed via the AWS SSM service, an agent that processes requests from the Systems Manager service in the cloud and configures a given machine as specified in the request.

How Beeswax enforced access control using AWS Identity and Access Management (IAM)
Beeswax wrote code on top of SSM that allows engineers to issue commands (from their workstations to InfluxDB) which are securely transferred using the AWS APIs and then securely executed on the actual instances. The aim was to centralize all access controls in the Beeswax system using AWS IAM.

How Beeswax tackles automated generation of TICKscripts
Kapacitor is deployed on EC2 autoscale group. Setting up alerts on Kapacitor requires writing TICKscripts. To avoid the need for its engineers to learn a new programming language, Beeswax wrote a Python tool called TickBuilder that generates these TICKscripts.

> *"TICK is a domain-specific language invented by InfluxDB. It's a very powerful language in which you can describe the way you're selecting rules and conditions."*
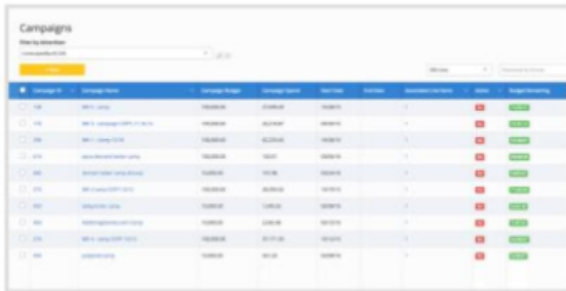
Results

Beeswax Bidder-as-a-Service™ enables sophisticated media buyers to extend and customize their own RTB bidder in the cloud while the Beeswax Programmatic Cloud™ makes the company's customizable and flexible bidder available to all customers, including those who may not have the resources or desire to deploy their own code on top of the Beeswax platform.

Beeswax Programmatic Cloud delivers cutting-edge functionality that is unavailable from mainstream DSP's. It offers the programmatic ecosystem the opportunity to continually adapt and innovate with the market while still reaping the benefits of a consolidated SaaS-based platform.

"Buzz" UI & Reporting Gets You Going Fast

Campaign Management

Performance Reporting

Roles, Permissions & Accounts
- Native support of multi-account access control
- Granular roles and permissions
- Activity logs for tracking

Rest API for Automation
- Pull reports into your dashboard
- Automate creation of line items, campaigns and creatives

Beeswax prices its Bidder-as-a-Service™ solution based on auction volume, or Queries Per Second (QPS), and this solution provides all the benefits of a DSP with flatter and lower ongoing costs. Beeswax offers customers four subscription plans: Start, Growth, Scale, and Enterprise.

Beeswax is enabling customers to take control of their Programmatic Advertising:

- With Bidder-as-a-Service™ as its core, Beeswax allows customers to combine and customize best-in-breed solutions from the programmatic ecosystem into a seamless whole with or without writing code
- Beeswax filters traffic for each individual advertiser based on the specific needs of their business, which improves visibility, reach and efficiency.
- Beeswax's disruptive Bidder-as-a-Service™ provides sophisticated advertisers with their own RTB bidder, giving them the transparency, flexibility and control they need to be successful.

Using InfluxDB, Beeswax is fulfilling its mission of "Powering the next generation of real-time bidding."

About InfluxData

InfluxData is the creator of InfluxDB, the leading time series platform. We empower developers and organizations, such as Cisco, IBM, Lego, Siemens, and Tesla, to build transformative IoT, analytics and monitoring applications. Our technology is purpose-built to handle the massive volumes of time-stamped data produced by sensors, applications and computer infrastructure. Easy to start and scale, InfluxDB gives developers time to focus on the features and functionalities that give their apps a competitive edge. InfluxData is headquartered in San Francisco, with a workforce distributed throughout the U.S. and across Europe. For more information, visit influxdata.com and follow us @InfluxDB.

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