SMART DATA FAST.™

VOLTDB

AIRPUSH

CASE STUDY

BACKGROUND

Ranked #2 in the 2014 Forbes list of “Most Promising Companies” and winner of the “Top Innovator in Advertising Data” award at the 2014 DataWeek Conference, Airpush is on a mission to redefine mobile advertising. More than 150,000 apps and the world’s leading advertisers rely on Airpush to deliver the industry’s highest performance, driven by exceptional ad formats and targeting technology.

The company’s self-serve advertising platform enables clients to purchase inventory from the Airpush mobile ad network and all major mobile real-time bidding (RTB) exchanges using a single, world-class interface. Clients can easily create and manage mobile ad campaigns across both Android and iOS devices, access incredibly detailed analytics, and optimize campaigns using Airpush tools. Airpush offers the deepest integration of any major mobile ad network, allowing mobile advertisers such as agencies, brands, and resellers to deeply integrate Airpush’s functionality into the tools and platforms they use every day.

OBJECTIVE

Building an IT infrastructure to manage online mobile advertising and enable accurate ad campaign balance tracking requires massive scale and unprecedented targeting capabilities. It also requires the ability to ingest, act on, and export fast-moving flows of data to support the delicate balancing act of matching mobile ad placements with buyer demands in real time.

The company originally built a MySQL infrastructure to manage advertising transactions. Airpush's business grew exponentially, pushing the limits of MySQL. To ensure the system would be able to process transactions fast enough to align advertising purchases with customer budgets, Airpush began to look into alternative, fast database technology that promised the ability to meet the realtime demands of mobile advertising customers. "We kept projecting additions of more database nodes and more people to manage them, but meanwhile the amount of transactions continued to grow rapidly," said Dan Khasis, Vice President of Data and Analytics for Airpush. "The growth in the number of tansactions would have had some negative impacts on our business. For example, if an advertiser only wanted to spend $10 a day and we sold them $12 worth of ads because we didn't correlate their sales quickly enough, we would have to swallow the difference. Multiply that by large numbers of advertisers and much larger advertising budgets and you can see we needed to move to a new database system that could handle both challenges simultaneously. We needed to find a new approach that would allow us to scale more cost effectively while handling mobile advertising data's speed and volume and supporting real-time analytics."

SOLUTION

Airpush has hundreds of millions of mobile devices connected to its mobile advertising platform. Latency is critical in the mobile advertising industry. "Database performance has to be absolutely reliable, every time," Khasis explained. "There's only one reliable benchmark in our industry and that's whether the mobile ads look good to the customers."

Traditional database systems are simply too slow to ingest data, analyze it in real-time, and make decisions. After a careful evaluation, Airpush selected VoltDB, the only in-memory, NewSQL solution that delivers Smart Data Fast. VoltDB offers the performance of in-memory, the scalability of NoSQL, and the transactional consistency of traditional relational databases.

With VoltDB, you can build transactional, database-oriented applications against data feeds that were previously limited to stream processing methods because of scale. VoltDB combines the capabilities of an operational database, real-time analytics, and stream processing in one easy-to-use platform. Because of the massive volumes of traffic that Airpush encounters on its mobile advertising network, validating performance was a major concern. Airpush worked closely with VoltDB before beginning the migration from its MySQL infrastructure.

"We were committed to deploying the highest-throughput database environment possible, so we wanted to conduct extensive testing in a high concurrency environment," Khasis stated. "Our engineers worked closely with VoltDB engineers to

ensure that VoltDB could perform consistently even when there was an exceptionally large number of database connections. We needed to be sure that our ads would be properly displayed and that we could eliminate the opportunity costs of placing the wrong ads."

RESULTS

Supporting hundreds of thousands of concurrent connections with round-trip latencies in milliseconds, VoltDB is an ideal platform for high-speed policy enforcement, authorization, rule evaluation, and quota management. "Because VoltDB ingests and acts on the fast data in real-time, Airpush has eliminated over-delivery of mobile ads," said Khasis. "Our managers are always able to view real-time information on spend data and earnings for each account, and we're able to maximize the deliverability of each ad by platform to ensure the greatest exposure for our advertisers. While other mobile advertising companies wait hours for this type of information, Airpush has instant visibility in real time to critical metrics that help us run our business."

Fast data is supporting other initiatives at Airpush. For example, it is feeding into the company's Optimizer tool to help customers make microadjustments to their advertising purchases to optimize campaigns by adjusting purchases based on balancing multiple metrics. Airpush has introduced next-generation audience targeting based on interests and behaviors, and its HyperTarget capabilities allow advertisers to target opted-in users based on their app download history. "We're able to leverage fast data to create unique features that are not possible with MySQL or MySQL enhancers, and we're able to deliver real-time analytics that can scale to support the fast pace of the mobile advertising industry," said Khasis.

VoltDB's high-availability architecture allows Airpush to ensure reliability. "We never encounter replication issues," Khasis explained. "Even if we lose a node everything's replicated. Before we had VoltDB, our engineers were often fixing deficiencies in the infrastructure instead of innovating in their core jobs. Server failures are inevitable, but with VoltDB rebalancing happens transparently. We even simulate server failures periodically by pulling power cables and everything always goes back online gracefully. We can also add new nodes without shutting anything down or scheduling maintenance because VoltDB is an easy-to-maintain architecture."

Airpush has developed dashboards that deliver custom views of the data for different audiences, such as advertisers, fraud teams, publishers, and executives. "We developed highly optimized views of the real-time data that provide key audiences with the information they need to make decisions quickly," Khasis stated. "Because VoltDB has both vertical and horizontal partitioning, we can aggregate the data much faster."

Once Airpush completes its migration from MySQL, Khasis expects that Airpush will dramatically reduce server infrastructure costs. "VoltDB has a ripple effect on our server costs. Since VoltDB processes the fast data in real-time, it decreases the load on our application servers because they don't have to wait for responses from database servers. We're able to optimize the efficiency of our server infrastructure and reduce our server infrastructure costs by 80%."