



WHITE PAPER

Reliable AdTech solutions: Build once, scale forever



Introduction

Increasing data volumes and stringent performance demands keep the AdTech industry forever on its toes. Companies need to handle massive data loads, ensure scalability, and maintain cost efficiency while delivering high-performance results. Though Google's delay in phasing out third-party cookies offers temporary relief, evolving data privacy regulations necessitate a shift towards more agile, efficient, and forward-thinking strategies.

With traditional signals diminishing, innovative technologies become essential for maintaining a competitive edge. Aerospike offers a powerful response with its advanced database, enabling AdTech firms to overcome operational challenges to remain scalable and cost-efficient in an ever-evolving landscape.

Adapting to AdTech challenges

The AdTech landscape is undergoing significant transformation, driven by key trends such as data privacy and the growing importance of first-party data. To remain competitive, companies must innovate and adapt their strategies to meet these evolving demands. Compliance with data privacy regulations like the GDPR and CCPA is not just a recommendation — it's a necessity. Robust technologies are essential for securely managing user data and staying ahead of these regulatory requirements.

Aerospike is uniquely equipped to guide companies through this transition. Its advanced data management solutions ensure secure handling of user data, empowering companies to confidently meet regulatory standards. As the industry moves away from third-party cookies, Aerospike supports companies in developing effective first-party data strategies, allowing them to continue delivering targeted advertising without compromising privacy.

Enhancing AdTech with advanced technologies

In an era of heightened data privacy and reliance on first-party data, machine learning (ML) and artificial intelligence (AI) are powerful tools for innovation. These technologies enhance audience segmentation, targeting, and fraud detection but require a robust infrastructure to function effectively. Aerospike provides the necessary data handling and real-time access capabilities crucial for the success of AI and ML initiatives.

By integrating with platforms like Spark and Kafka, Aerospike ensures effective ML model development and deployment, keeping AdTech teams at the forefront of AI-driven technologies. This integration allows AdTech companies to fully harness the potential of first-party data, driving innovation and maintaining a competitive edge.

Why Aerospike?

Aerospike stands out as a game-changer in the AdTech industry, offering unparalleled scalability, performance, and cost-efficiency. Its infrastructure is designed to address the industry's most pressing challenges, providing a solid foundation for modern operations:



Scalable architecture that grows with you

Aerospike's distributed system architecture supports both horizontal and vertical scaling, allowing companies to seamlessly expand as data demands grow. This ensures consistent performance, even with increasing data volumes, enabling businesses to scale alongside their needs.



High throughput for critical operations

Capable of processing up to 200 million transactions per second with sub-millisecond latency, Aerospike is ideal for high-stakes AdTech operations that demand rapid data processing. This capability is crucial for ad bidding and delivery, where speed is essential.



Consistent performance, no matter the load

Unlike traditional databases that with performance consistency across varying data volumes, Aerospike excels in maintaining reliable performance from gigabytes to petabytes of data. This ensures that AdTech companies can manage fluctuating loads without compromising speed or efficiency, meeting performance targets and maintaining customer satisfaction with ease.

Powering precision with speed and scalability

Aerospike empowers AdTech companies to tackle industry challenges, driving efficiency and performance by simplifying decision-making processes, leveraging extensive user profiles for precise targeting, and maintaining speed and scalability during peak demand.

Technical deep dive: Unpacking advanced data solutions

Aerospike's advanced architecture is the backbone of its exceptional performance, providing the necessary infrastructure to meet the toughest demands while maintaining continuous operations:

Distributed architecture: Aerospike supports horizontal scaling and ensures high availability, allowing companies to scale up their operations without compromising performance.

Hybrid Memory Architecture™: By integrating DRAM and flash storage, Aerospike optimizes performance and cost by combining DRAM and flash storage, providing a powerful solution for data-intensive tasks.

Cross-Datacenter Replication: Seamless data replication across multiple data centers improves data accessibility and reliability.

Server compression: Advanced compression techniques reduce infrastructure costs and energy consumption, enhancing sustainability and cost-efficiency.

Failover mechanisms: Robust failover strategies ensure reliability and uptime, providing high availability even during system interruptions.

Leveraging graph and identity solutions

Unlocking the potential of complex data relationships, graph databases present new opportunities for AdTech innovation. Aerospike Graph equips companies with the tools to elevate data processing and decision-making, providing a competitive edge in a dynamic landscape.

Graph databases for enhanced targeting

Graph databases are pivotal for seeking deeper insights into customer interactions. By integrating Aerospike Graph, businesses can process intricate data relationships, resulting in more nuanced and personalized advertising strategies. This capability not only enhances targeting precision but also strengthens decision-making frameworks.

Identity graphs for a 360-degree customer view

Identity graphs are becoming increasingly essential tools in AdTech. They enable companies to create unified customer profiles across devices and touchpoints, even in environments where traditional tracking methods are less effective. By consolidating data from multiple sources, identity graphs can provide a complete picture of each customer, creating a golden record.

Best practices for graph database implementation

Implementing graph databases with Aerospike involves several key steps to ensure optimal scalability and performance:

- **Data modeling:** Use a property graph data model to represent users, devices, and interactions as vertices and edges.
- **Query language:** Employ graph-native query languages like Gremlin or Cypher for efficient data traversal, querying, and visualization.
- **Scalability:** Ensure horizontal scalability to handle growing data volumes and query throughput while maintaining low latency.

Example queries and use cases

- **Dynamic creative optimization:** Use graph queries to personalize ad creatives based on detailed user profiles and preferences.
- **Cross-device tracking:** Implement queries that map user interactions across multiple devices, providing a comprehensive view of user behavior.

By integrating these advanced graph solutions, Aerospike empowers AdTech companies to fully harness the power of their data, driving innovation and maintaining their competitive edge.



Emerging trends

Staying competitive in AdTech requires embracing emerging trends that redefine industry standards. Aerospike is instrumental in helping companies stay ahead with innovative solutions across key areas:

- **Edge computing:** As edge computing gains momentum, Aerospike's robust data platform excels at real-time data processing directly at the edge. This ensures high throughput and low latency, enabling faster and more efficient ad delivery.
- **Cross Datacenter Replication (XDR):** Beyond its technical prowess, XDR technology ensures seamless data consistency and availability across global operations. This capability allows organizations to confidently expand and manage operations worldwide, knowing their data is reliably synchronized across multiple data centers.
- **Sustainability:** Committed to supporting companies in achieving their Net Zero 2030 targets, Aerospike focuses on energy efficiency and reducing carbon footprint reduction by optimizing infrastructure and operations.

Real-world success with Aerospike

Aerospike's impact goes beyond theory — it's proven in real-world applications. Leading AdTech companies have successfully implemented Aerospike to overcome significant challenges, optimize operations, and achieve outstanding results. The following case studies highlight how Aerospike has enabled leading companies to overcome challenges and achieve significant results in AdTech.

Criteo: Powering global ad bidding



Background

Criteo, a global leader in digital advertising technology, caters to over 18,000 customers, delivering five billion ads daily through its Commerce Media Platform. This platform's success hinges on real-time bidding for online display ads, requiring highly efficient data processing and rapid decision-making.

Challenges

Criteo faced challenges with its existing infrastructure, which relied on outdated versions of Memcached and Couchbase. As data demands surged, the need for a more capable system became evident. Key challenges included managing 950 billion matches daily with 50 ms response times and handling peak transactions of 270 million per second. Additionally, they needed to reduce server counts and overcome limitations in performance, scalability, and speed.

Solutions

Criteo chose Aerospike for its superior performance, scalability, and low latency. By migrating to Aerospike, Criteo simplified its data infrastructure, eliminating the need for a separate cache layer. This transition resulted in sub-millisecond reads at the 99th percentile and optimized server utilization by consolidating different workloads on a single cluster.

Results

- 80% reduction in carbon footprint
- Improved scalability and performance
- Enhanced reliability and responsiveness
- Standardized platform meeting current and future demands

The Trade Desk: Hyperscale ad bidding



Background

The Trade Desk stands as the largest independent programmatic advertising DSP globally, enabling digital advertising through a self-service platform. This operation processes around 10 million queries per second, demanding swift and precise data storage and retrieval.

Challenges

The Trade Desk needed a robust infrastructure capable of handling extensive third-party data for real-time bidding. Their system required support for 11 million queries per second at the edge and peak loads of 20 million writes per second in cold storage.

Solutions

Aerospike was deployed to manage hot cache and cold store requirements effectively. Record-level compression reduced the machine count to 60, and a flexible data organization model simplified data retrieval. This setup enabled The Trade Desk to handle 30 million key-value tuples per second in a 1 PB cold cache, with data access times reduced to 8 ms for real-time bidding.

Results

- Significant reduction in infrastructure costs
- Enhanced data processing efficiency
- Improved performance and scalability

Preparing for the future with Aerospike

In an ever-evolving AdTech landscape, staying ahead is not just beneficial — it's essential. Aerospike's cutting-edge database solutions equip companies with the tools to confidently navigate industry transformations. Offering unparalleled scalability, cost efficiency, and reliability, Aerospike empowers AdTech firms to optimize their operations and maintain a competitive edge. By embracing Aerospike's innovative technologies, businesses can ensure they are well-prepared for the future's demands and opportunities.

For organizations eager to elevate their operations and drive innovation, we invite you to contact our sales team. Discover how Aerospike can be your partner in achieving business growth and sustaining a competitive advantage in the AdTech industry.

