

# MAXIMIZE THE VALUE OF YOUR OPERATIONAL DATA

## Modernize and Transform Your Enterprise via Real-time Transaction and Analysis Processing

### Highlights

- Rapid read/write speeds without extensive tuning or a separate data cache
- Substantially smaller footprints than popular alternatives, often leading to 3-year total cost of ownership (TCO) savings of \$3-5 million per application
- 24x7 availability, including cross-datacenter replication
- Operational ease during scale-out and maintenance
- Interoperation with popular software offerings, including Apache Hadoop, Spark, and Kafka
- Service-level agreements (SLAs) that require sub-millisecond database response times
- High throughput for mixed workloads (e.g., 3-5 million operations per second)
- Support for managing billions of business records in databases of 10s-100s TB

### Overview

It might sound too good to be true: a database system that processes large volumes of operational data in real-time while delivering exceptional runtime performance, high availability, and cost efficiency while still keeping your data safe. What if early adopters in banking, telecommunications, and other industries are already harnessing such a database for achieving results that are transforming their businesses in myriad ways? What if published benchmarks demonstrate sub-millisecond response times for high throughput read/write workloads over high data volumes with substantial cost savings compared with traditional alternatives?

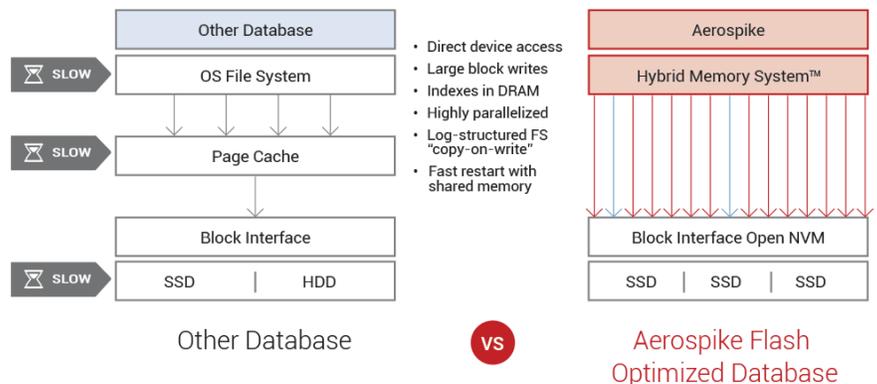
### The Technology in Brief

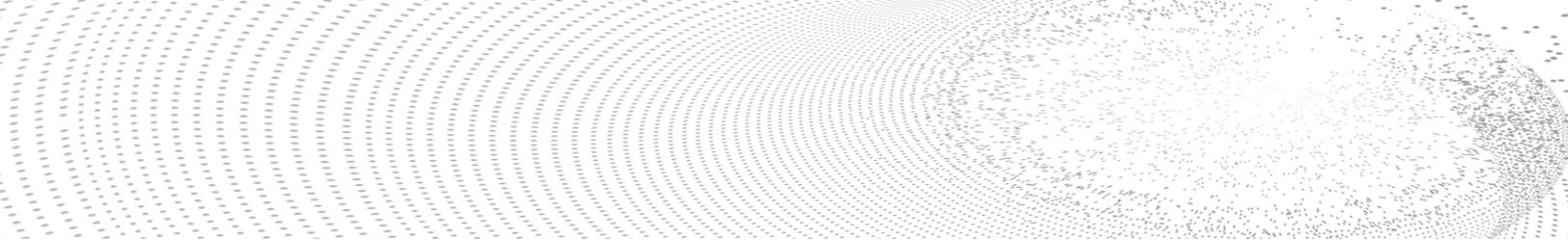
Aerospike provides a distributed, highly scalable database management system for demanding read/write workloads involving operational data. It was designed to deliver extremely fast—and predictable—response times for accessing data sets that span billions of records in databases of 10s – 100s TB. Other design features address fault tolerance and near 100% uptime even during upgrades and maintenance.

### Key Features and Technology

Aerospike is a shared-nothing database system that operates on a cluster of commodity server nodes:

- It's a schema-free, key-value data store.
- Aerospike exploits volatile and non-volatile memory in a distinctive way, providing rapid access to index and user data.
- An intelligent client layer minimizes costly network “hops” needed to access data.
- Immediate record-level consistency and high availability are guiding principles.
- Access management controls and transport encryption protect sensitive data.
- Asynchronous replication across data centers provides disaster recovery.
- Ready-made connectors, a publish/subscribe messaging system, and partner offerings help firms integrate Aerospike into their existing IT infrastructures.



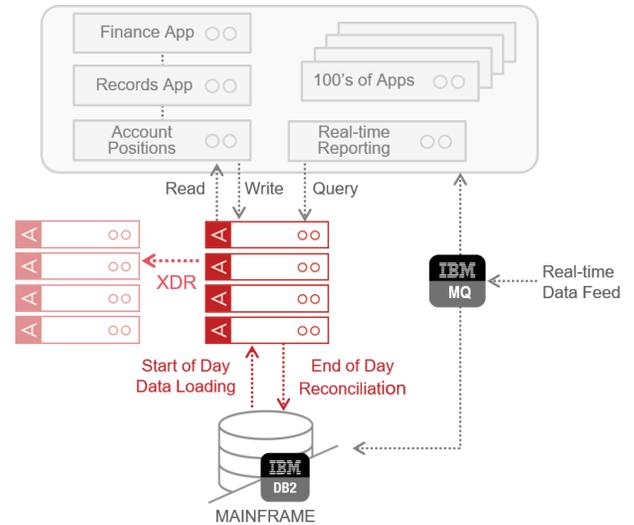


## Applications and Use Cases

Enterprises often turn to Aerospike to handle large volumes of transactions from customer-facing applications and to support new applications requirements that frequently arise with “systems of engagement” – i.e., systems that foster collaboration and interaction with users. Social media, mobile devices, cloud computing, real-time chats, streaming data, and other technologies are enabling individuals to engage with enterprises in new ways, driving IT organizations to develop systems that support such engagement. Aerospike’s transactional capabilities have prompted some firms to use its technology as a system of record as well.

### Intra-day trading for Financial Services

A global investment bank with \$3 trillion in client assets uses Aerospike to offload work from its mainframe solution for financial trades. Today, a 12-node Aerospike cluster serves as the system of record for intra-day trades, replacing the cache and offloading some work previously done on the mainframe. With its modernized infrastructure, the firm now enjoys a five-fold increase in processing speeds. Database access times dropped to sub-milliseconds even though the database size increased from 4 to 14TB. Furthermore, Aerospike enabled the firm to accomplish this with 90% fewer servers deployed, saving an estimated \$10,000 per trading day.



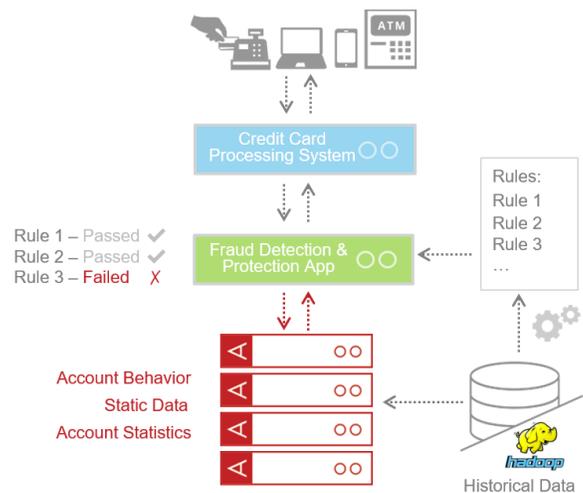
### Reduce operational database server footprint by 10:1 (saving millions in ownership costs)

Consider a firm that needs to manage 10TB of unique operational data consisting of 10 billion objects with an average size of 1K per object. Two popular options are: (1) a caching layer with an operational data store or (2) Aerospike. To compare these options, assume the firm will use servers with roughly 200GB free DRAM and 4TB in SSD storage per node. A cache-based option would require 186 nodes just for the caching layer; more nodes would be needed for the ODS and data storage. By contrast, Aerospike would recommend only 14 nodes to achieve comparable runtime performance and store the data.



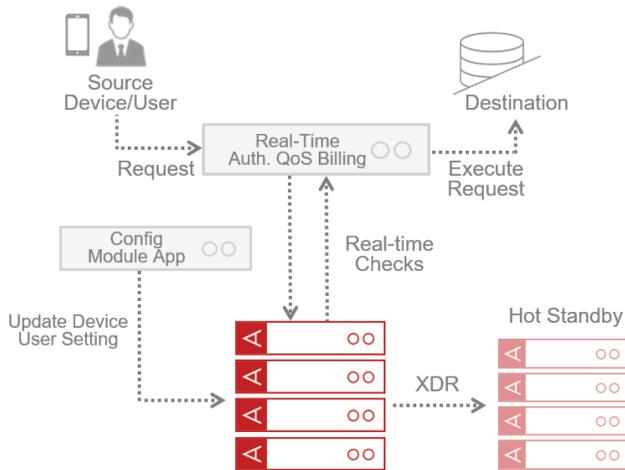
### Fraud detection for Digital Payments

A global payments provider is minimizing its annual fraud losses by improving its fraud detection algorithm SLAs by a factor of 30x with Aerospike. The firm moved from a 2-layer architecture consisting of Oracle RAC and 360 Terracotta servers to a 20-node Aerospike cluster. Now it runs fraud detection rules against 99.95% of its transactions within its target SLA of 750 milliseconds. The company supports real-time decision analysis by combining the transactional systems with analytics systems to drive profitable business outcomes.



## Real-time billing for Telecommunications

Consumer demand for mobile data services has prompted telecommunications providers to develop sophisticated, personalized data plans. Real-time tracking of data usage at a granular level – such as the source of a data packet – is critical for generating accurate bills, as some carriers offer unlimited data for specific streaming services (such as Spotify) but not others (such as YouTube).



Several firms now rely on Aerospike to keep pace with these billing challenges. Typically, they deploy Aerospike at the edge of their networks to monitor traffic, record chargeable events, and update user device settings to reflect authorized changes to data plans.

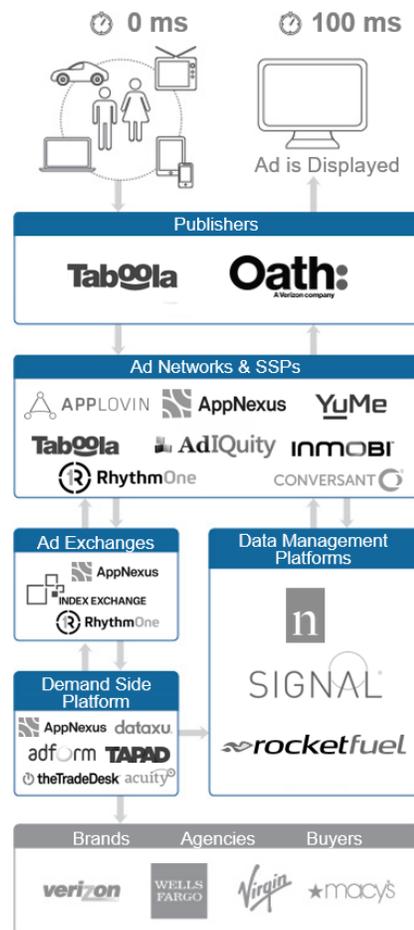
The systems replaced by Aerospike in these use cases include Oracle TimesTen and Coherence as well as internal home-grown in-memory systems in some cases. Such applications require Aerospike to manage several terabytes of data and process up to 200,000 transactions per second. Going forward, Aerospike, in its Strong Consistency version, can be reliably used for directory lookup of devices in a mobile network.

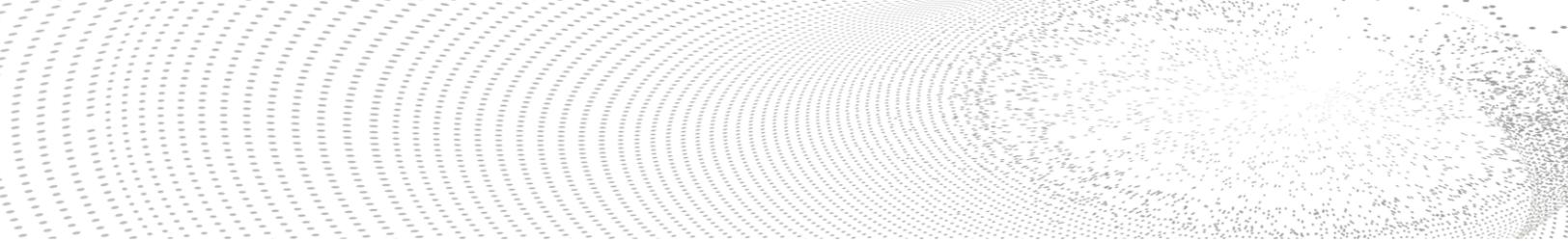
## Real-time bidding for Online Advertisements

Advertising technology (AdTech) firms were among Aerospike's early adopters and have driven Aerospike's dominance as the preferred database infrastructure for real-time bidding applications in that industry.

AppNexus, InMobi, and others rely on Aerospike to power online auctions for advertising space that occurs in real time just before a web page is displayed. SLAs in this field are extremely demanding: 50 milliseconds for real-time bidding and 100 milliseconds for rendering the ad.

For each real-time bid, multiple database reads and writes occur to execute a single transaction, all within these super-tight SLA windows – a challenging situation that is compounded by the magnitude of the database store of billions of records and up to 100 TB of data.





## Summary

Transforming IT infrastructures by leveraging operational data in real-time can yield compelling business results. Indeed, firms that have teamed with Aerospike cite remarkable performance, substantial cost savings, and increased business agility among the key benefits they're enjoying for their mission-critical applications. Not surprisingly, a [2017 market survey by Forrester Research](#) cited very high levels of satisfaction.

While such achievements might sound too good to be true, production use has proven otherwise. Earlier sections of this paper took you through several client examples as well as presented an overview of Aerospike's HMA to help you understand how it achieves such results. Innovative use of volatile and non-volatile memory, exploitation of clustered computing environments, sophisticated data distribution techniques, and a "smart client" software layer are just some of the technologies that make this possible.

While exploring any new technology involves some effort and risk, innovation often drives new opportunities. And, as this paper discussed, Aerospike clients often save millions of dollars by shrinking the server footprint required for their critical applications. Maybe you still find all this hard to believe. Or maybe you're not convinced that your business can enjoy the same type of results. That's understandable. To find out if Aerospike can really impact your business and deliver tangible results, why not take the next step? [Contact us](#) for a personalized total cost of ownership (TCO) estimate.

### About Aerospike

Aerospike is the world's leading enterprise-grade, internet scale, key-value store database whose patented Hybrid Memory Architecture™ enables digital transformation by powering real-time, mission critical applications and analysis. Only Aerospike delivers strong consistency, predictable high performance and low TCO with linear scalability. Serving the financial services, banking, telecommunications, technology, retail/ecommerce, adtech/martech and gaming industries, Aerospike has proven customer deployments with zero downtime for seven years running. Recognized by industry analysts as a visionary and leader, Aerospike customers include Nielsen, Williams Sonoma, Kayak, Neustar, Bharti Airtel, ThreatMetrix, InMobi, Applovin and AppNexus. Aerospike is based in Mountain View, CA, and is backed by New Enterprise Associates, Alsop Louie Partners, Eastward Capital Partners, CNTP and Silicon Valley Bank.

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