

Enterprise Edition Database 5

PRODUCT BRIEF

Act in real time across billions of transactions while reducing your server footprint

Changing customer expectations and industry disruptors are driving significant investments in digital transformation initiatives across multiple industries. To compete in today's real-time digital economy, companies must invest in the right petabyte scale data platform to enable the right decisions in the moments that matter. This is only possible by utilizing modern data architectures which support predictable performance at scale. A modern data platform consists of the following components: System of Engagement (SOE) databases that capture real-time data from edge and near-edge devices; System of Record (SOR) databases which store both the real-time data from the SOE database and historical data which acts as the single source of truth; Global Transactional Databases which can span across geographical regions and can process billions of records daily with no data loss; and analytic, AI, and ML databases that leverage the combined data. Overall, high-speed data transfer between these components is required as they enable real-time decisioning in the microsecond moments that matter.

Highlights

Powers Real-time Enterprise Use Cases

Aerospike's performance at scale, combined with its critical enterprise database features and integrations allows it to be utilized as a System of Engagement (SOE), Global Transactional Database, System of Record (SOR) and Query and Reporting Database in real-time.

Unmatched Uptime and Reliability

Aerospike uniquely combines proven five-9's+ of uptime with predictable high performance. In high availability scenarios, Aerospike multi-site clustering supports strong immediate data consistency. With a single Aerospike cluster deployed across multiple geographic regions, a highly resilient solution can support automated failovers without loss of data.

Performance at Any Scale

Aerospike's dynamic cluster management and unique flexible storage engine enable our database to reliably handle millions of transactions per second while efficiently scaling to meet petabyte-range data volumes.

Exceptionally Low TCO

Fueled by our patented Hybrid Memory Architecture™, Aerospike provides unmatched performance at 20% the total cost of ownership (TCO) of legacy NoSQL databases. The TCO advantage is even more pronounced in multi-node and multi-cluster scenarios.

Aerospike Real-Time Data Platform

Aerospike provides predictable performance up to petabyte scale, with five-nines uptime with always accurate, global, consistent data for all components of the end-to-end platform (Figure 1). The platform consists of these elements:

- 1 Edge Database (SOE)** – Used for real-time decisioning based on local streaming and transactional data plus historical data pulled dynamically from the SOR.
- 2 Real-time Core Database (SOR)** – Stores transactional and historical data and pushes data as needed to the SOEs also powering ML and AI-based applications.
- 3 Global Transactional System** – Utilizing Multi-Site Clustering, the Aerospike Database can be deployed across multiple geographically separated data centers with high resiliency, automated failovers, and no loss of data.
- 4 Query and Reporting Database** – Stores historical data primarily for reporting and visualization purposes, integrated via Aerospike Connect for Spark.
- 5 Aerospike Cross Datacenter Replication (XDR)** – Enables multiple geographically dispersed data centers to stay in sync through high performance replication.
- 6 Aerospike Connect for Spark** – Enables companies to directly integrate the Aerospike Database with their existing Spark infrastructure.
- 7 Aerospike Connect for Kafka, JMS, and Pulsar** – Makes it easy for enterprises to exchange data bi-directionally between the Aerospike Database and enterprise transactional systems and Legacy Data Stores.
- 8 Aerospike Connect for Presto** – For accessing data in Aerospike Databases utilizing standard SQL language.
- 9 Aerospike Clients** – High performing clients offered and supported by Aerospike.

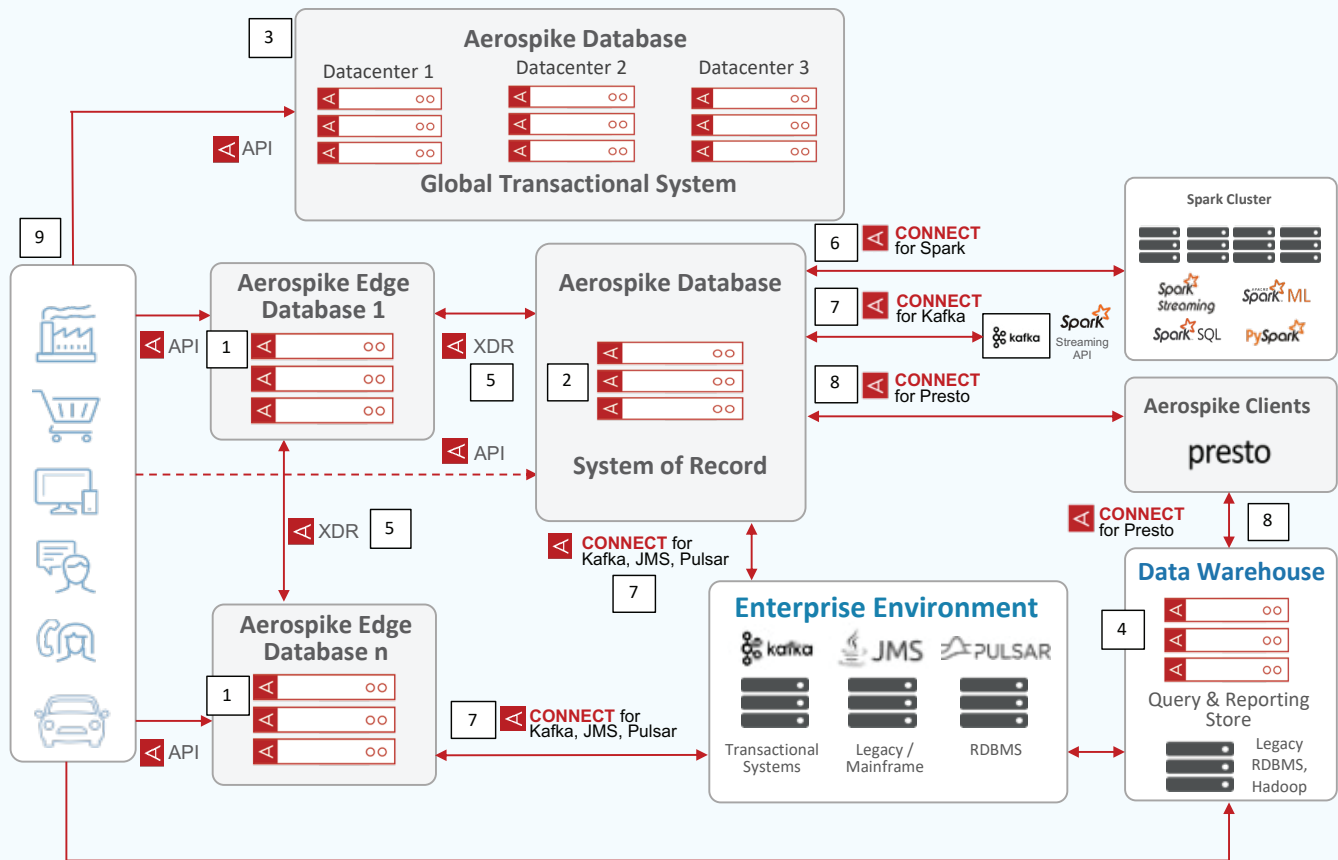


Figure 1. Aerospike Real-time Data Platform

Meeting Petabyte Scale Enterprise Data Management Requirements

The Aerospike real-time data platform, powered by the Aerospike Enterprise Edition Database 5 delivers millisecond response times at scales of terabytes-to-petabytes for the strictest enterprise requirements:

Predictable Performance

High Throughput and Low Latency - Multi-threaded parallel processing at the CPU combined with our patented Hybrid Memory Architecture (Figure 2) designed for flash storage devices uniquely deliver predictable high performance at scale.

Smart Client Architecture - Aerospike's smart client architecture ensures parallel access to multiple servers in a cluster for the highest possible performance.

Real-Time Data Transfer Between Edge and Core - Aerospike XDR enables multiple geographically dispersed data centers to stay in sync through high performance replication.

Support for Next-generation Memory - Aerospike is the first open database supporting the Intel® Optane™ DC persistent memory (PMem) combining DRAM-like performance with flash-like persistence. Both data and the indexes can reside in PMem for extreme performance.

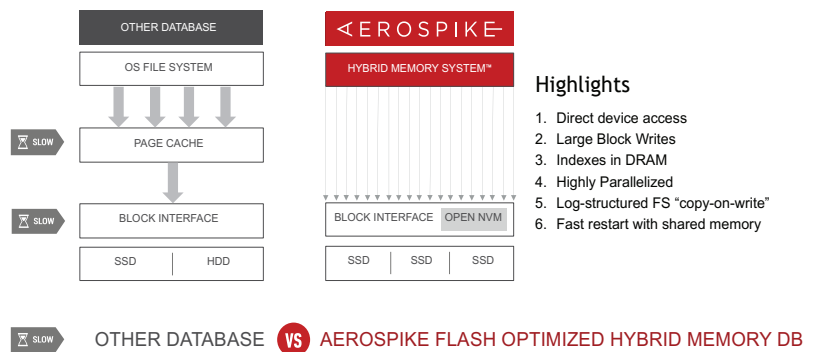


Figure 2: Aerospike's patented Hybrid Memory Architecture™

Durability/Consistency

Durability - Data can be replicated asynchronously across geographies and synchronously written to other nodes in the cluster and to flash storage without disruption for the highest durability.

Consistency - Aerospike provides strong consistency on primary key access that has been confirmed through Jepsen test results. Data held in Aerospike is always guaranteed to be correct in all scenarios. Aerospike Multi-site Clustering brings the Jepsen validated Strong Consistency to deployments across multiple sites.

High Availability/Replication

Uptime and High Availability -

Aerospike provides high availability and a demonstrated uptime of five 9s or more which is made possible by our unique cluster management and intelligent client technology.

Synchronous Data Replication - Aerospike Multi-Site Clustering supports always-on, strongly consistent, globally distributed transactions at scale. It provides a true real-time Active-Active solution with great resiliency on WANs.

Asynchronous Data Replication - XDR delivers expressions-based fine-grain control of asynchronous replication of data across geographically distributed clusters. It can be used to create a global data hub, allowing to route and augment data captured at the edge to other clusters.

Scalability

Scalability - The Aerospike Hybrid Memory Architecture with All Flash and Hybrid Flash options, coupled with Dynamic Cluster Management, allows the Aerospike database to scale to petabytes and store transactional/streaming/real-time data as well as historical data.

Compression - Aerospike's storage compression feature provides lossless compression of records written to persistent storage. Additionally, the communication between the Clients and the database is also compressed.

Query Optimizations

Aerospike Expressions - Execute operations and functions closer to the data for more efficient comparisons of values, even extending the ability to read, write, and execute complex computations as arguments in other operations.

Set Indexes - Provide efficient access to a Set within an Aerospike Namespace. This feature allows fast queries of records within a Set in a petabyte scale database.

Secondary Indexes - Support large, more mission-critical data sets achieving fast query results and low server footprint utilizing:

- Efficient memory management
- Fast and efficient garbage collection system

Enterprise Security

Encryption - Aerospike supports full transport encryption, as well as in-database transparent data encryption.

Authentication - LDAP, Kerberos, and PKI authentication mechanisms are supported. Rich sets of access control options are available including ACLs.

Authorization - Aerospike provides a sophisticated role-based access control (RBAC) system.

Centralized Secret Management Option - Aerospike allows the following security items to be managed by and stored within HashiCorp Vault's KV secrets engine:

- LDAP user credentials and TLS certificates
- XDR remote destination passwords
- Encryption-at-rest key
- Network TLS certificates and keys

Auditing - Aerospike can be configured to generate audit log messages on a wide variety of security events. Developer Features

Aerospike Clients - a large number of high-performing clients are offered and supported by Aerospike, including the REST Client which is a standard interface for the Aerospike database.

Complex Modeling - Scalar data types: Integer, Double, String, BLOB, Bytes; Collection data types: List (Ordered and nonordered), Map (Key-Ordered, Key Value-Ordered, Unordered); Probabilistic data types: HyperLogLog, HyperMinHash; Geospatial: GeoJSON data type.

Change Notification Framework - Allows Aerospike servers to stream changes to other systems via Aerospike Connect components. Allows for building easy yet reliable and scalable systems for complex event processing (CEP).

Cloud Foundations

Aerospike Cloud Foundations currently supports Google Kubernetes Engine (GKE) on Google Cloud Platform (GCP) and includes the following foundational components required for running an Aerospike DBaaS:

- Helm Charts based Aerospike Database cluster
- Prometheus and Grafana based Aerospike Monitoring Stack

Integrations

Integration with Existing Data Stores and Systems - for building modern data pipelines and powering highly scalable/low latency AI/ML applications. The Aerospike Connect product line is currently composed of:

- Aerospike Connect for Spark
- Aerospike Connect for Kafka
- Aerospike Connect for JMS
- Aerospike Connect for Pulsar
- Aerospike Connect for Presto

Deployment Options

In Data Centers and Private Clouds

In Public Cloud - Google Compute Platform, Amazon Web Services, Microsoft Azure, Alibaba Cloud and others.

Aerospike Cloud Managed Service -

Aerospike experts deliver and maintain an optimized deployment of the Aerospike database in cloud environments with white glove service.

Database Product Features

License

Aerospike Server License Type - Commercial License
 Aerospike Client License Type - Apache v2

Support

Binaries - Tested & Verified
 Enterprise Production Support
 Hot Patch Availability
[Community Support](#)

Architecture

[Multi-site Clustering](#)
[Strong Consistency](#)¹
[Rack Awareness](#)

Storage Engine

[All Flash](#)¹
[Intel Optane DC Persistent Memory support](#)

Performance

Transactions or Queries per Second - Unlimited
[Namespaces 2 \(32 max\)](#)
[Objects per Namespace per Node 2 \(0.5 Trillion max\)](#)

Security

[TLS Transport Encryption](#)
[Security: ACLs](#)
[Data Encryption-at-Rest](#)¹
[LDAP Authentication](#)¹
[Kerberos Authentication](#)

Operations Features

[Backup & Restore](#)
[Cross Datacenter Replication \(XDR\)](#)
 Rate Quotas
[Change Notification](#)
[Rapid Rebalance](#)
[Uniform Balance](#)
[Delay Fill Migrations](#)
[Quiescence](#)
[Compression](#)¹
[Fast Restart](#)
[Durable Delete](#)
[Read Page Cache](#)
[IPv6](#)

Query Optimizations

Aerospike Expressions
 Set Indexes

Aerospike Connect

[Aerospike Connect for Spark](#)¹
[Aerospike Connect for Kafka](#)¹
[Aerospike Connect for JMS](#)¹
[Aerospike Connect for Pulsar](#)¹
[Aerospike Connect for Presto](#)¹

¹ Available with additional licensing

² See [Known Limitations](#) for more information



The Aerospike Real-time Data Platform enables organizations to act instantly on billions of transactions while dramatically reducing server footprint. The Aerospike platform powers real-time applications with predictable performance up to petabyte scale. Aerospike customers can instantly fight fraud, dramatically increase shopping cart size, deploy global digital payment networks, and deliver instant, one-to-one personalization for millions of customers. Customers include Airtel, Experian, Nielsen, PayPal, Snap, Verizon Media and Wayfair. The company is headquartered in Mountain View, Calif., with additional locations in London; Bengaluru, India; and Tel Aviv, Israel. For more information, please visit <https://www.aerospike.com>.

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