

Cross-Datacenter Replication (XDR) for Global Data Hubs

Highlights

Dynamic Data Center Addition and Configuration

With XDR for Aerospike Database 5, the process of adding and configuring new data centers to the cluster is dynamic and can be performed while the remote clusters are running.

Selective Shipment of Record Components

Now it is possible to ship changes in bin segments, which ultimately speeds up the data transfer and reduces network traffic.

Resynchronize a Data Center Starting at a Point-in-Time

With record shipping based on Last Update Time (LUT), it is now possible to resynchronize data centers starting at a user specified LUT.

Repair or Catch up Data Center

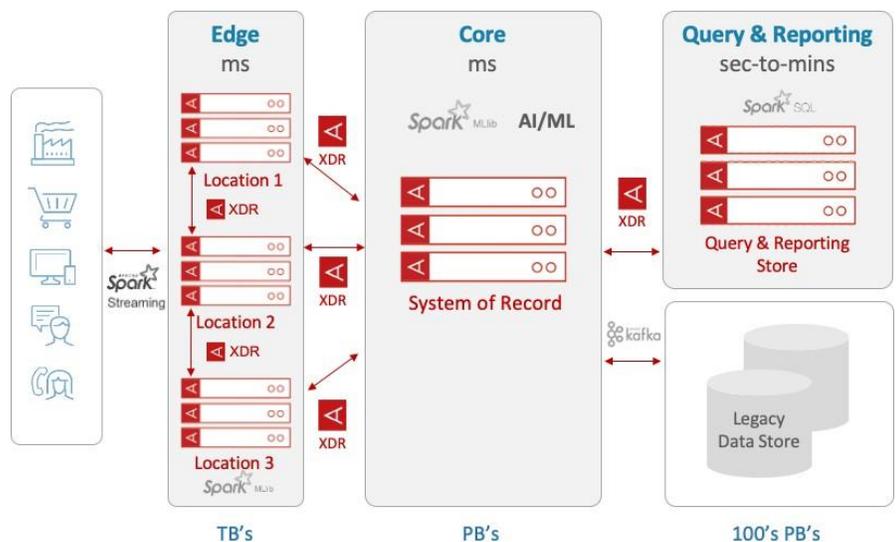
This new capability to repair or catch up a data center is based on injecting a timestamp and utilizing that as a starting point for the data transfers.

Dynamic, fine-grain data control

Utilizing expressions, XDR allows fine-grain data control of hyperscale global workloads for compliance mandates and infrastructure efficiency.

Overview

Aerospike Database 5 XDR's new capabilities include better management and control of the replication of your global data across geographically separated clusters. With the release of Aerospike Database 5, XDR meets the requirements of a global data hub, allowing customers to dynamically route data captured at the edge to where it is needed – in Aerospike clusters or any other repository. Using shipping based on Last Update Time (LUT) improves accuracy and reduces overhead for storing the shipping state associated with a source and target pair. Utilizing expressions, XDR allows fine-grain data control of hyperscale global workloads for compliance mandates and infrastructure efficiency.



Aerospike as a Data Hub using XDR

Key Features

Efficient Storage of Shipping State

All records are shipped based on LUT. XDR keeps track of "Last Ship Time" (LST) for every source/target pair and all records with $LUT > LST$ are eligible for shipping.

Dynamic, Fine-grain Data Control

- XDR can be configured to ship only the changes to sub-parts (bins) of a record.
- Expressions can be used for filtering updates and inserts and applied to individual records being shipped. Bin projection is applied to the records passing the filter.

Better Integration with Aerospike Database 5

XDR shipping is integrated with the Strong Consistency scheme of Aerospike Database 5. Better integration translates into shipping efficiencies, better correctness on node failures, and improved performance.

Increased Throughput and Lower Latency

Aerospike Database 5 combined with XDR serves as an Active-Active configuration that trades off strong consistency between sites for low latency reads and writes.

Data Transfer to Non-Aerospike Data Repositories

Utilizing a connector linked to Aerospike's change notification mechanism, it is possible to integrate Aerospike Database 5 into existing systems, such as ERP, CRM and Inventory.

Reliable Disaster Management

The following rewind capabilities are available:

- Ability to resync a Data Center starting at specified LUT
- Ability to repair or catch up a Data Center by injecting a timestamp
- Set Start mode: can specify recovery or initial sync after adding a new Data Center dynamically

Independent Shipping

The shipping between every source/target link is kept independent, so the performance of a node in a target cluster will not affect

Business Benefits

Global Data Hub

The XDR for Aerospike Database 5 can be used to create a global data hub, allowing enterprises to route and augment data captured at the edge to other clusters which could be Aerospike or other databases. It delivers exceptional management and control of asynchronous replication of data across geographically distributed clusters for global, disaster-proof applications. Data hubs built utilizing Aerospike's XDR technology can also help companies to comply with global and local data privacy regulatory requirements.

Ideal for Low Latency Use Cases

The speed and throughput improvements in XDR for Aerospike Database 5 enables utilization for use cases where low latency is a must. This is an Active-Active system that trades off strong consistency between sites for low latency reads and writes, which is ideal for applications such as those with e-commerce and ad tech industries, amongst others.

Use Cases



Nielsen stores Ad Tech device information and event history in real-time on billions of users. The Aerospike Database with Cross-Data Center Replication is deployed at Nielsen to provide low latency, reliable replication between North America and Europe. Low latency transactions on user objects are paramount to keeping their competitive edge. They conduct real-time modeling and analysis, returning the information to the user in milliseconds.

“Cross Datacenter Replication is vital to our organization. We need to have redundant data centers. We need our user objects to be available in multiple facilities. The ability to replicate data across region is something that Aerospike provides that very (few) other NoSQL databases do with ease. It's able to take advantage of a 20-gigabit link without a problem and ship data continuously.”

Henry Snow
Vice President of Infrastructure
Nielsen Marketing Cloud @ Nielsen

shipping speed to a different node in the same target cluster or to a different target cluster from the same source.

Reduced Total Cost of Ownership

Aerospike has been known to provide the best performance and the lowest server count thus the lowest TCO among NoSQL databases thanks to its Hybrid Memory Architecture™ and dynamic cluster management. When running multiple clusters across the globe, with the efficiencies introduced in Aerospike Database 5 XDR, the TCO advantage is even more pronounced as the cumulative server count will be much lower for Aerospike to achieve the same level of performance as other solutions. Obviously, the network speed will also play a role for throughput and latency, but that will be similar for each solution.

Improved Compliance Adherence

With filter-based expressions, Aerospike XDR can ship exactly the data needed to the exact locations. Thus, data can be programmatically kept local yet accessed as needed without needless duplication.



At ThreatMetrix, a LexisNexis Risk Solutions company, Aerospike is deployed to handle over 130 million

transactions a day to manage real-time customer trust decisions, virtually eliminating false positives and greatly enhancing fraud detection. To meet these low latency, high transaction volume requirements with distributed datasets, they utilize Aerospike's Cross Datacenter Replication.



Verizon Media is undertaking a global platform modernization effort consolidating and streamlining its real-time data infrastructure with Aerospike. They are

replacing a 2-3 petabyte 20-year-old system-of-record, and its User Data Profile for its 2 billion customers. These two solutions address all key value stores across the company, including its two billion users across all Verizon Media domains including sports, finance, and mail. The solution spans five datacenters, leveraging Aerospike Cross-Datacenter Replication (XDR), Intel® Optane™ DC persistent memory, and large-scale servers.

About Aerospike

Aerospike is the global leader in next-generation, real-time NoSQL data solutions for any scale. Aerospike enterprises overcome seemingly impossible data bottlenecks to compete and win with a fraction of the infrastructure complexity and cost of legacy NoSQL databases. Aerospike's patented Hybrid Memory Architecture™ delivers an unbreakable competitive advantage by unlocking the full potential of modern hardware, delivering previously unimaginable value from vast amounts of data at the edge, to the core and in the cloud. Aerospike empowers customers to instantly fight fraud; dramatically increase shopping cart size; deploy global digital payment networks; and deliver instant, one-to-one personalization for millions of customers. Aerospike customers include Airtel, European Central Bank, 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.

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