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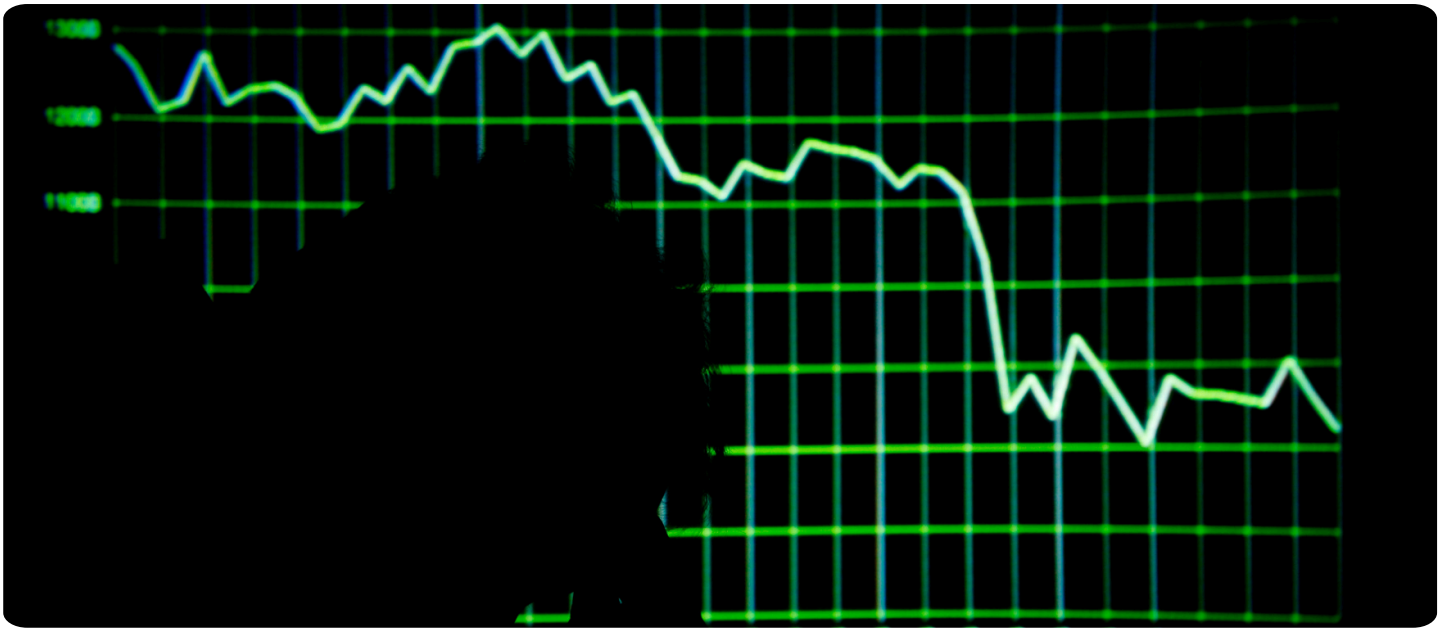
LEADING STOCK BROKER OPTIMIZES AWS DOCUMENTDB PERFORMANCE, CUTS CPU USAGE BY 33%, AND ACHIEVES SEAMLESS TRADE EXECUTION WITH AHANA



Client Profile

One of India's largest stock brokers, our client operates in a high-frequency trading environment where speed, reliability, and compliance are critical. With a strong presence in the financial sector, they facilitate real-time trade execution and seamless transaction processing for a vast customer base. Given the regulatory landscape, maintaining infrastructure efficiency and optimizing performance are key priorities to ensure uninterrupted operations and cost-effective scalability.

Challenge

The client faced performance bottlenecks due to high CPU utilization on AWS DocumentDB, which severely impacted real-time trading and customer experience. During peak trading hours, the database reached full capacity, leading to system slowdowns and unresponsiveness.

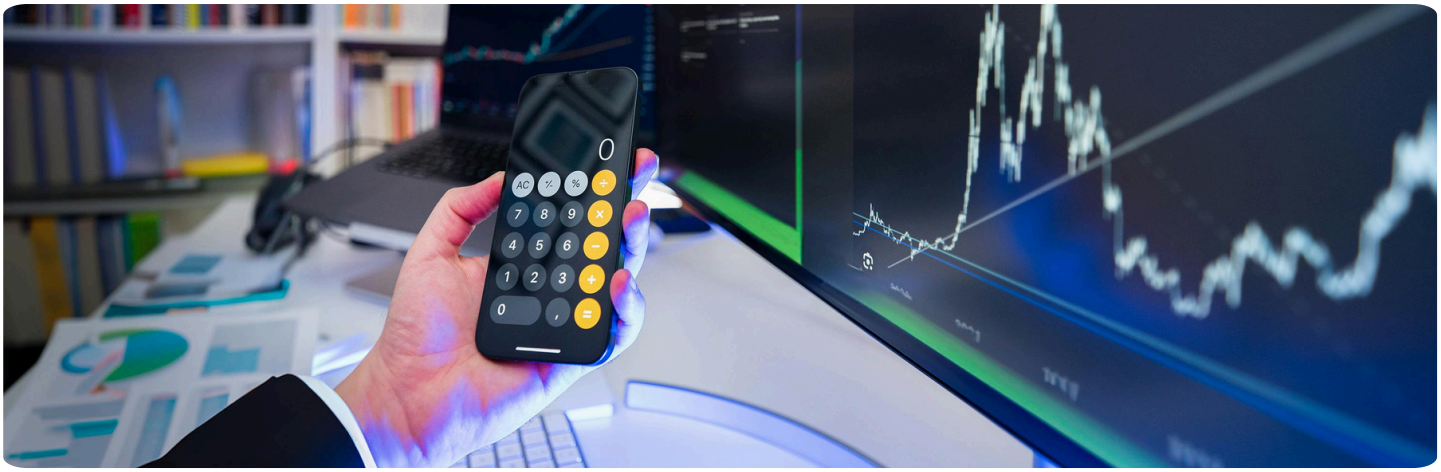
Additionally, regulatory compliance required CPU usage to remain within specific thresholds for audit purposes. However, long-running queries caused delays and resource inefficiencies, further straining the system.

To maintain seamless trading operations, optimize costs, and ensure compliance, the client required a scalable and efficient solution to enhance database performance while minimizing downtime.

Our Approach

To address the client's database performance challenges, Ahana adopted a structured approach focused on efficiency, cost optimization, and compliance:

- **Comprehensive Performance Assessment:** Conducted an in-depth analysis of AWS DocumentDB to identify high CPU utilization patterns, long-running queries, and indexing inefficiencies affecting real-time trading performance.
- **Indexing & Query Optimization:** Implemented Single-field, Compound, Multi-key, and Compound Multi-key indexes to refine query execution, reduce processing time, and improve data retrieval efficiency.



- **Resource Allocation & Cost Optimization:** Scaled down CPU and memory configurations by 33% on both primary and replica instances, significantly reducing operational costs while maintaining optimal performance.
- **Workload Distribution & Replication Optimization:** Redirected read queries to replica nodes to offload processing from the primary instance, ensuring load balancing and faster transaction processing.
- **Minimal Downtime Implementation:** Strategically executed performance enhancements during non-market hours to prevent disruptions to real-time trading operations and ensure business continuity.
- **Regulatory Compliance & Reporting:** Ensured that post-optimization CPU utilization reports remained within regulatory audit thresholds, mitigating compliance risks and enhancing infrastructure transparency.

Ahana's Solution

To resolve the high CPU utilization and ensure seamless database performance, Ahana implemented a structured optimization approach that enhanced query execution efficiency, resource allocation, and system scalability while minimizing downtime.

1) Indexing and Query Optimization

- Implemented Single-field, Compound, Multi-key, and Compound Multi-key indexes to improve query efficiency.
- Optimized long-running queries to reduce execution time and prevent system slowdowns.

2) Resource Optimization and Scaling

- Scaled down CPU and memory usage by 33% on both primary and replica instances, significantly reducing operational costs.
- Redistributed workload by ensuring read queries were executed on replica nodes instead of primary instances, balancing system load.

3) Implementation with Minimal Downtime

- Applied all fixes during non-market hours to prevent disruptions to real-time trading operations.
- Ensured a seamless transition by carefully planning changes and monitoring performance post-implementation.

Impact

Ahana's optimization efforts resulted in substantial performance and cost improvements for the client:

1) 33% Reduction in CPU and Memory Usage: Optimized resource allocation significantly lowered operational costs, leading to monthly savings of approximately **$3,600 (~₹3,13,640 INR).**

2) Zero Replication Delays: Post-optimization, data replication became seamless, ensuring faster trade execution and improved customer transactions without bottlenecks.

3) Enhanced Query Performance: Optimized indexing and query execution strategies eliminated long-running queries, improving overall system responsiveness.

4) Regulatory Compliance Assurance: Ensured that CPU usage reports remained within audit thresholds, mitigating compliance risks.

5) Increased Customer Satisfaction: The improved system stability and responsiveness were acknowledged by the client, resulting in direct appreciation for the performance enhancement.

Conclusion

By implementing a structured indexing strategy and optimizing database resource allocation, Ahana successfully enhanced the efficiency of the client's AWS DocumentDB environment. The approach not only ensured regulatory compliance but also led to substantial cost savings and operational improvements.

Moving forward, the client plans to further optimize AWS efficiency by adopting additional indexing strategies and enhancing read query execution on replica nodes.

About Ahana Systems and Solutions

Ahana Systems & Solutions is a leading IT Infrastructure Management Services and Digital Transformation company specializing in optimizing cloud, database, and enterprise IT ecosystems. With deep expertise in Cloud Computing, RPA, Database & EDW, BI & Analytics, and Application Development, Ahana delivers scalable, cost-effective, and future-ready technology solutions. Our tailored approach ensures high-performance infrastructure, regulatory compliance, and operational efficiency for enterprises worldwide.

With a strong presence across India, Europe, and the USA, and a portfolio of 100+ clients, Ahana enables businesses to achieve digital excellence by leveraging automation, AI-driven insights, and optimized IT frameworks.

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