Scalable “Always On” Solution Powered by AWS Serverless

Overview

The National Election Processing (NEP) organization needed a way to process votes from hundreds of concurrent sources. These sources included manual data entry and automated vote feeds. The goal was to process the votes from hundreds of election periods as quickly as possible. Considering scalability and affordability, our developers created an event-driven pipeline powered by AWS Serverless, which brought an innovative solution to transform NEP's vote processing capabilities.

Problem

The NEP faced the challenge of processing hundreds of concurrent votes from different elections in the least amount of time. The votes came in for weeks. During the state primary election season, reporting of multiple elections occurs simultaneously, and this continues for months. The system must also be constantly active, as votes could come in at any time. Originally, the system had to be manually brought up and down to keep costs low.

Solution

ThorTech leveraged AWS Serverless, utilizing AWS Lambda, ECS Fargate, AWS Kinesis, AWS Kinesis analytics, AWS Managed Kafka, and ElasticCache Redis, to develop a solution. Our developers created an event-driven pipeline using these different services. The event-driven pipeline incorporated AWS Kinesis streams with AWS Lambda integration, which enabled real-time processing of streaming data. Furthermore, AWS Managed Kafka and ECS Fargate were employed to handle the high volume of votes efficiently. To aggregate and analyze the streaming events, Kinesis Analytics was utilized, providing valuable insights into the voting patterns and trends.

THORTECH SOLUTIONS

About Thortech

ThorTech Solutions, a New York-based software engineering and cloud consulting firm with over 22 years of experience, provides services such as application architecture, DevOps infrastructure, managed services, and staffing to help accelerate business initiatives.

Our team focuses on putting ourselves in customers’ shoes, delivering business objectives by leveraging the best technologies, and optimizing costs.

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To ensure scalability and optimize performance, we introduced a tumbling window mechanism. This efficiently throttled new events onto new streams. The new implementation triggered other Lambdas to facilitate seamless processing across concurrent elections. Additionally, ElasticCache Redis was leveraged by Lambdas for performance caching, which further enhanced the system's responsiveness and reduced latency. Finally, AWS Kinesis was vital in providing comprehensive tracing, logging, and monitoring capabilities. This ensured that the NEP's system remained secure and transparent.

Result

With ThorTech's innovative approach and expertise in Data Architecture and Cloud Solutions, the NEP achieved an "always on" system that effectively scales as needed, while keeping infrastructure costs under control. The previous manual process of bringing system components up and down is now a thing of the past. With the AWS Serverless architecture and the intelligent utilization of AWS services, the NEP can seamlessly handle the influx of votes from hundreds of concurrent sources, whether over weeks or months, without compromising speed or accuracy.

Conclusion

The scalable nature of the system allows for effortless expansion as voting demands increase. Moreover, the cost-effective implementation ensures that the NEP can operate efficiently within budget constraints. The introduction of automated event-driven processing has revolutionized the way votes are handled. We have eliminated the need for manual interventions, and we have ensured a streamlined and optimized voting process.