INDIUM

Turbocharging Global Supply Chain Operations: How Indium Leveraged Elasticsearch for Smarter Solutions

SUCCESS STORY

Client Overview

With an extensive global supply chain network, the client is a global leader in the manufacturing of industry-grade equipment. Their product range includes central heaters, air conditioners, electric vehicles, air cleaners, fluid handling systems, and more, catering to a diverse and international customer base. Beyond their core manufacturing expertise, the client has also established an extensive global supply chain network, enabling them to efficiently serve retail brands and help them adapt to rapidly changing consumer preferences and manufacturing trends. Leveraging their deep industry experience, market knowledge, and advanced technological capabilities, the client has positioned itself as a trusted partner for businesses seeking to stay competitive in dynamic markets.

Battling Slow Indexing and Lagging Searches: The Quest for a Seamless User Experience

The client faced a significant challenge with their digital infrastructure, particularly on their website. The primary issues revolved around page synchronization and search latency, which were negatively impacting user experience and operational efficiency. The existing system's data model was outdated and inflexible, limiting the website's ability to handle large volumes of data and deliver real-time results. This lack of performance and adaptability not only hindered the client's ability to meet customer expectations but also posed a risk to their competitive edge in an increasingly digital-first marketplace.

Addressing these technical limitations became a critical priority to ensure seamless functionality, improved customer engagement, and sustained growth. Let's look at the major business requirements that necessitated change.

Enhance the Data Model to Reduce Time Lag and Improve Efficiency:

The data model was deemed a bottleneck, causing significant delays in data processing and retrieval. To rectify this, a redesign and optimization was undertaken, including a restructuring of the database schema, elimination of redundant data, and the implementation of efficient indexing strategies. This aimed to reduce time lag, enhance system efficiency, and ensure smoother data flow.

Improve the Website Data Retrieval Process by Incorporating Better Sync and Faster Search:

The website's data retrieval process was plagued by slow synchronization and high search latency, leading to poor user experience. To address this, advanced synchronization mechanisms were implemented, ensuring real-time data updates and consistency, resulting in quicker, more accurate search results and improved website responsiveness and usability.

Enhance the System Through Performance Tuning:

Performance tuning was crucial to improve the system's efficiency and handle increasing user demands. It involved analyzing performance metrics, identifying improvement areas, and applying targeted optimizations to create a robust, scalable system that delivers consistent, high-performance results even under heavy loads.

Modernizing Legacy Systems: Indium's Blueprint for Scalable and Efficient Architecture

Indium played a pivotal role in helping the client overcome the limitations of their legacy system, which relied on a parent-child architecture in Postgres. In this setup, the parent mapping contained the main product details, while the child held the product attributes. This structure, while functional, led to inefficiencies such as slow data retrieval, high search latency, and frequent page synchronization issues. To address these challenges, Indium stepped in with a tailored strategy to modernize and optimize the system.

Introducing a Multi-Index Architecture:

Indium designed a new architecture that replaced the outdated parent-child model with four distinct indices in Elasticsearch. The innovative approach categorized product attributes into separate indices, improving organization, faster data retrieval, and ensuring daily page refreshment without compromising system performance, ensuring website responsiveness.

Harnessing Elasticsearch for Enhanced Search and Retrieval:

To address slow search latency, Indium leveraged Elasticsearch's powerful capabilities for real-time indexing and efficient data retrieval. This shift enabled faster, more accurate search results, significantly improving the user experience and reducing wait times for customers.

Migrating Widgets from Postgres to Elasticsearch:

Indium facilitated the seamless transfer of most widgets from Postgres to Elasticsearch by scraping and migrating the necessary data attributes. This migration reduced the load on the Postgres database, streamlined data management, and enhanced overall system efficiency.

Containerizing Backend APIs with Docker:

To modernize the backend infrastructure, Indium implemented a containerized approach using Docker. This allowed for the execution of backend APIs in a scalable and resource-efficient environment. The use of Docker simplified deployment, improved system agility, and ensured the platform could handle growing data demands with ease.

Indium Enabled Business Growt with Tangible Results from System Optimization

- **Nearly 80% Improvement in System Efficiency and Data Retrieval Time Lag:**
  By redesigning and enhancing the data model, Indium achieved a **significant 80% improvement in system efficiency**. The optimized data model reduced bottlenecks, time lag, and operational sluggishness, accelerating processes and enhanced system reliability, enabling faster and more consistent results for the client.

- **85% Reduction in Search Latency with Elasticsearch Implementation:**
  The integration of Elasticsearch brought a remarkable **85% improvement in search latency**. By leveraging Elasticsearch's real-time indexing and powerful search capabilities, the client's website could deliver faster and more accurate search results. This enhancement significantly improved the user experience, ensuring customers could find what they needed quickly and efficiently.

- **90% Faster Page Synchronization Through Improved Architectural Design:**
  The new multi-index architecture and optimized data organization led to a **90% reduction in page synchronization time.** This improvement ensured that the website remained up-to-date with the latest product information and changes, providing users with a seamless and consistent experience. The faster synchronization also reduced operational overhead, allowing the client to focus on delivering value to their customers.

- **Enhanced User Experience Through Performance Tuning:**
  Performance tuning played a critical role in creating a **more immersive and responsive user experience.** By optimizing backend processes, refining resource allocation, and implementing caching strategies, the system became more agile and capable of handling increased traffic. This resulted in driving higher customer satisfaction and retention.
  These measurable improvements not only resolved the client's technical challenges but also delivered tangible business benefits, positioning them for sustained growth and success in a competitive market.