INDIUM

Advancing Next-Gen Reporting Systems: RNA Splicing Error Report Generation Using ROR for A Genetic Engineering Company

SUCCESS STORY

Client Overview

The client is a rapidly growing genetic engineering firm at the forefront of RNA splicing error research and development. As a leader in this specialized field, they sought to enhance their capabilities in RNA research and therapeutic advancements. To achieve this, they aimed to develop an innovative solution that could accurately identify and address RNA splicing faults using predictive analytics.

Overcoming Bottlenecks in RNA Analysis: Enhancing Efficiency and Performance

1. Struggling with Speed: Performance Bottlenecks in RNA Analysis

The client relied on an existing application to identify, catalogue, and interpret RNA patterns. However, when generating reports for experimental findings, the system experienced significant performance issues, leading to delays and inefficiencies.

2. A Race Against Time: The Need for Streamlined Processes

The slow reporting process consumed valuable time, hindering research progress. Determined to overcome these challenges, the client sought a solution to enhance operational efficiency and accelerate RNA research breakthroughs.

Accelerating RNA Insights: Critical Business Requirements

To enhance the accessibility and efficiency of experiment result analysis, the client outlined the following business prerequisites:

R-Powered Reporting: Integrate R programming with the application to streamline report generation.

Faster Experiment Insights: Optimize the system to generate experiment reports within the shortest possible timeframe.

Cloud-First Deployment: Host the application on the Microsoft Azure cloud platform for scalability and performance.

Breaking Barriers in RNA Research: Faster Reports, Smarter Storage, and Scalable Performance

Phase 1

Indium implemented the following solutions to streamline report generation for RNA sequence experiments.

- **Enhanced Report Generation with RoR:** We updated the report generation application built on Ruby on Rails (RoR) to accommodate the new requirements.

- **Seamless Integration of R for Dynamic Reporting:** Incorporated an R programming engine to generate reports dynamically triggered by the RoR application with specific parameters.

- **Automated Report Creation and Rendering**: The R engine processes an input .txt file to generate an HTML report, which is then seamlessly rendered within the RoR application.

- **Optimized Performance with Smart Tab Splitting:** Utilized RoR's capabilities to split multiple tabs into individual Rails processes, significantly reducing wait times and enabling faster result access.

- **Efficient Data Storage and Space Optimization:** We implemented a dynamic .txt file generation system, ensuring that files are stored in the Rails repository and overwritten when new inputs are added, optimizing disk space.

- **Accelerated Report Loading with Pre-Generated Data:** To speed up report generation, we designed the system to generate an .Rdata file during the first execution, allowing subsequent reports to load faster without reprocessing all files.

- **Scalable and Secure Cloud Deployment:** We deployed the RoR application using Docker containers on the Microsoft Azure cloud, ensuring scalability, reliability, and high-performance processing for seamless RNA experiment reporting.

Phase 2

- **Empowering Users with Direct Code Customization**

  In the second phase of the engagement, the team plans to enable users to modify or update the RMD code directly within the application. Users will be able to log in, navigate to a designated tab, and make updates through the portal instead of altering the codebase manually.

From Delays to Discovery: A New Era of High-Performance RNA Report Generation

The solutions we implemented delivered a transformative impact on the client's business.

▶ **Speed Unleashed: Reports in Just 15 Seconds:**
By splitting multiple tabs into individual Rails components, we slashed report generation time to an impressive 15 seconds, significantly improving efficiency and enabling users to access results almost instantly.

▶ **Simplicity is Power: Cleaner Code, Smoother Operations:** Streamlining the Ruby on Rails (RoR) application drastically reduced code complexity, resulting in a more intuitive system that enhances usability and accelerates workflows.

▶ **30% Faster Insights: Smarter Data Handling:**
The introduction of .Rdata file generation allowed reports to load much faster on subsequent runs, eliminating redundant processing and ensuring quicker access to crucial insights.

▶ **Always Available, Always Reliable: Cloud-Optimized Performance:**
Dockerized cloud deployment enhanced the application's availability and maintainability, ensuring seamless access and streamlined management.

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About Indium

Indium is an AI-driven digital engineering company that helps enterprises build, scale, and innovate with cutting-edge technology. We specialize in custom solutions, ensuring every engagement is tailored to business needs with a relentless customer-first approach. Our expertise spans Generative AI, Product Engineering, Intelligent Automation, Data & AI, Quality Engineering, and Gaming, delivering high-impact solutions that drive real business impact.

With 5,000+ associates globally, we partner with Fortune 500, Global 2000, and leading technology firms across Financial Services, Healthcare, Manufacturing, Retail, and Technology—driving impact in North America, India, the UK, Singapore, Australia, and Japan to keep businesses ahead in an AI-first world.

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