Providing Analysis & Key Performance Indicator Dashboard with FedWriters

A Professional Readiness Experiential Program (PREP) Project Effort

----- ***Authors / Student Project Team Members*** -----

Keon Harandi is a student at George Mason University graduating with a bachelor's degree in Business Analytics. He developed an understanding of KPIs and the reliance companies have on them. The FedWriters team effectively took all of the PREP students under their wing, and showed them how to use AWS as a backend database.

Fernando Urbina-Resendiz is a student at George Mason University graduating with a bachelor's degree in Business Analytics. During this project, he deepened his understanding of key performance indicators (KPIs) and understanding of using real-time data. These experiences have prepared him to effectively leverage technology and analytics in solving real-world business challenges.

Dinh Luu is a student at George Mason University graduating with a bachelor's degree in Business concentration on Business Analytics. I have learned a lot from the project working with FedWriters which is dealing with their challenges. Also, doing group work with my teammates helps me learn teamwork and communication skills.

Hawa Suri is a student at George Mason University graduating with a bachelor's degree in Management Information Systems. Due to this project, she was able to obtain real-world experience using real-time data, and by doing so gained various forms of skills that will be beneficial in the future to come. Thanks to her team members, clients and professors that helped guide them along the way to create the best possible outcome.

----- ***Industry Participant / Mentor*** -----

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Interested in being an Industry Participant and or PREP Sponsor? Please reach out to bngac@gmu.edu, Thanks!

----- Client Testimonial ----

"The team not only met but exceeded expectations with their solution and recommendations. Their dedication to understanding and addressing the challenges not only of the project, but also continually learn and grow was awesome!

The students transformed our project/application by putting our needs at the forefront. Throughout the project, they consistently prioritized user experience and business requirements, ensuring every feature served a clear purpose. They fearlessly tackled complex technical challenges well beyond their experience, dedicating themselves to finding and implementing effective solutions through thorough research and experimentation. Even when faced with unfamiliar technologies and frameworks, they showed remarkable resilience and resourcefulness in acquiring new skills on demand.

By carefully balancing input with technical feasibility, they delivered recommendations that were both practical and powerful. Their iterative approach to development, coupled with regular client consultations, resulted in solutions that precisely matched our organization's needs.

The students' commitment to excellence was evident in every aspect of their work, from their detailed technical analyses to their clear communication of complex concepts to stakeholders. They consistently exceeded expectations by not just meeting basic requirements, but by identifying and addressing potential future challenges in their implementations. Beyond advancing our project, these students proved themselves ready for professional challenges, showing the kind of initiative, technical acumen, and collaborative spirit that would benefit any organization. Their performance sets a new standard for what we can expect from student developers and demonstrates the immense value that emerging talent can bring to professional software development projects."

- Marc Fain | Chief Revenue Officer | FedWriters

Introduction

FedWriters, a government contracting agency specializing in communications and documentation needs of their clients. Their operations run on a real-time analytical basis. This has highlighted inefficiencies due to the lack of a centralized dashboard, in which there is a need of designing a business health tracker. Leveraging Amazon Web Services (AWS) technologies, our team focused on developing a user-friendly platform that delivers real-time data and predictive analytics to enhance FedWriters data integration and strategic decision-making.

Business Challenge

FedWriters operates in an environment with increasing demands for real-time decision-making. However, their current data processes suffer from several significant challenges that hinder operational effectiveness and strategic planning: Through multiple requirements determination sessions with FedWriters, we were able to develop an AS-IS process and identify multiple areas of concerns.

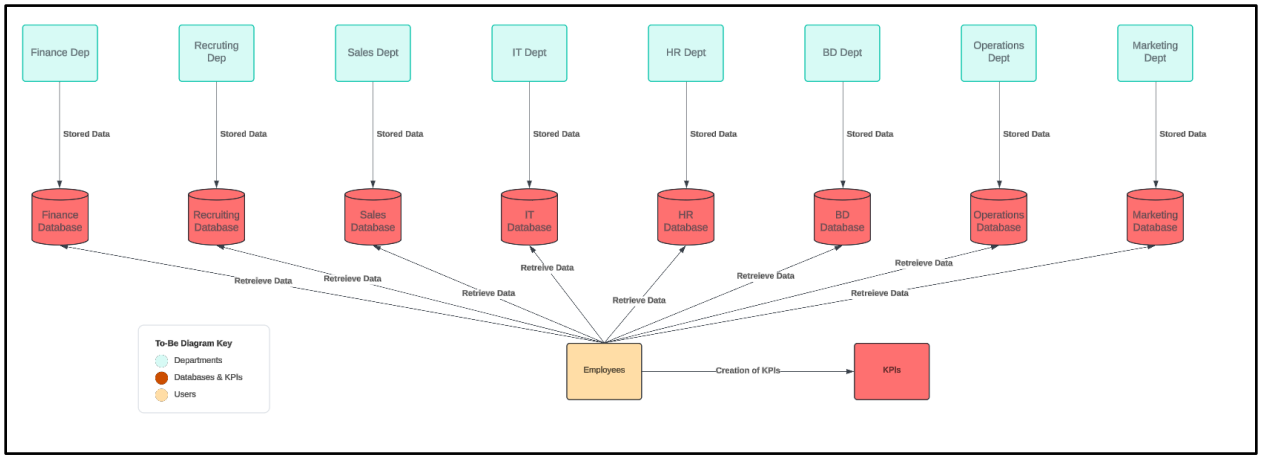

Figure 1: AS-IS Key Performance Indicators Aggregation Process

- **Fragmentation:** Data is stored across multiple cloud systems, making it a challenge to aggregate and analyze KPIs.
- **Lack of Real-Time Insights:** Departments rely on manual processes with KPI data gathering, and creation. This creates delays in tracking KPIs affecting timely decision-making.
- **Limited Predictive Capabilities:** Without advanced analytics, FedWriters struggles to anticipate trends or simulate scenarios for proactive management.
- **Operational Inefficiencies:** Disjointed systems hinder cross-departmental collaboration, leading to redundant data entry and inconsistent reporting.

Activities Done to Address the Business Challenge

To address the challenges, the team proposed the following TO-BE process to improve how data is aggregated across the different departments for better information access, visualization, and dashboarding. Every month each department will submit their data to databases created for the

dashboard. The Lambda functions within AWS will then be used as the backend for the web - developed KPI Dashboard. To then finally culminate into the Dashboard all users will be able to access.

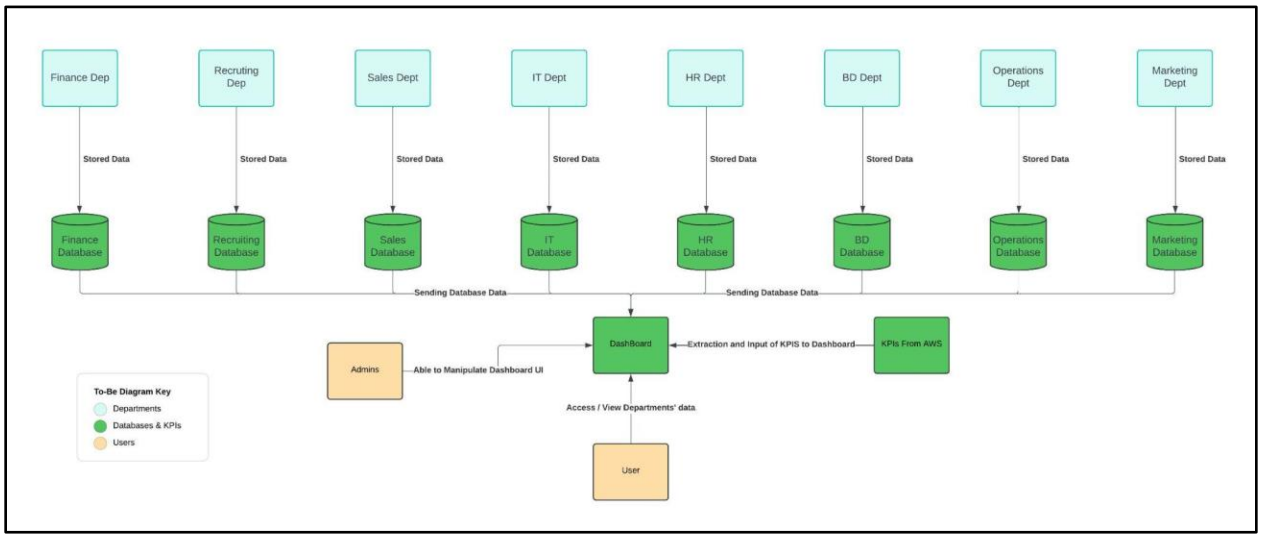

Figure 2: TO-BE Process Dashboard

To implement the TO-BE process, the team worked to build out the following in Amazon Web Services Lambda Functions:

- Uploading CSV files of each department data in AWS.
- Integrating cross-departmental data into a database.
- Creating KPIs goals for each department.
- Implementing Python code into Lambda functions on AWS, aiming to find the Percentage towards the created KPIs Goal to be displayed on Dashboard.
- Creating a user-friendly dashboard for all users to access and track the KPIs.

Results & The Positive Impact

Through our development efforts based on FedWriters requirements, we were able to deliver the following:

- A fully clean and prepared dataset, ready for use in the system.
- An operational data pipeline delivering live updates to dashboards and predictive models.
- A system that has been thoroughly tested and approved by users for functionality and accuracy.
- A fully operational Business Health Tracker system, accessible to all stakeholders and tailored to departmental needs.

We also delivered a dashboard which aggregates the different department data into a singular database:

- Dashboard is a robust, user-friendly platform designed to track, analyze, report and predict outcomes for the KPIs of eight departments in FedWriters.

- Dashboard is customizable that allows users to adjust parameters and see real-time predictions.
- Admin are FedWriters managers who could adjust dashboard KPIs to provide insights and make data-driven decisions.
- Viewers could be FredWriter staff who could view the dashboard to know the current status of the company.

We are able to make an impact to FedWriters through delivering the following:

- ***Developing a Business Health Tracker:*** Creating a comprehensive business health tracker system that is designed to deliver real-time insights into key performance indicators (KPIs) that are both financial and operational. This system is designed to pull data from across various departments, processing it with efficiency and being able to present a visual dashboard.
- ***Predictive Analytics and Simulations:*** Implement advanced capabilities both that are predictive analytics and simulation tools to support strategic planning. By leveraging historical and real-time data forecast trends, identify potential challenges within the current systems and developing business scenarios. Analyzing potential outcomes through "what-if" scenarios to make an informed decision for optimal operational outcomes. To be able to both positively minimize risks and maximize opportunities within a business landscape.
- ***User-Friendly Integrated Platform:*** Delivering a user-friendly and integrated platform that is designed for the simplification and enhancing the data tracking reporting processes.

Conclusion

This project focused on providing a solution for FedWriter's key requirements on developing a comprehensive dashboard. The dashboard that was being established primarily focused on establishing a centralized system for data integration. Our team's objective was to construct a business health tracker equipped with the means to create a platform to handle key predictive analytics and simulations, along with a user-friendly interface. By delivering this tool and being able to achieve the goals, our team ensured the incorporation of operational efficiencies, real-time predictive capabilities and decision-making processes to be executed seamlessly. As a result our team, with the usage of AWS was able to deliver an active business health tracker, allowing FedWriters with a platform for efficient data implementation and management.

PREP Student Reflection

From this experience, we are grateful to the professor and FedWriters for allowing us to work on this project with them. FedWriters was more than generous to take the time to meet with us on a weekly basis and teach us valuable skills that will be advantageous when we take on what the future has in store for us. As students, it is valuable that we now have credible background in real-world operations. We are appreciative of our professor, who presented us this opportunity with hands-on experience, and provided us with nothing but knowledge and feedback to take with us indefinitely. This project allowed us to realize our strengths and weaknesses and how they are to be implemented in a real-world setting. Which in terms, allow us to embellish our capabilities indefinitely.