Internship at Goldman Sachs

Data Dictionary

Submitted by:

Pragya Das   **PES2UG21CS381**

Under the guidance of

Manikesh Verma
Vice President,
Goldman Sachs

8 weeks

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
FACULTY OF ENGINEERING
PES UNIVERSITY
(Established under Karnataka Act No. 16 of 2013)
100ft Ring Road, Bengaluru – 560 085, Karnataka, India

CERTIFICATE

Goldman Sachs Services Private Limited
Opel | Salarpuria Sattva Knowledge City | Hi-Tec City | Hyderabad - 500081 | India

Registered office: Helios Business Park |150 Outer Ring Road | Kadubeesanahalli
Bengaluru - 560103 | India
Tel: + 91 80 4127 1600 | Fax + 91 80 4127 1601
CIN: U72400KA2003PTC032606

Goldman
Sachs

To Whom It May Concern:

This is to confirm that Pragya Das completed her internship with Global Compliance of Goldman Sachs
Services Private Limited - Hyderabad from June 03, 2024 to July 26, 2024

We wish her all the best for future endeavors.

Arti Mehta
Vice President
Human Capital Management
For and on behalf of Goldman Sachs Services Private Limited

DECLARATION

We hereby declare that the project entitled **Data Dictionary** has been carried out at Goldman Sachs by me under the guidance of Manikesh Verma, Vice President, and submitted in partial fulfillment of the credits for the degree of **Bachelor of Technology** in **Computer Science and Engineering** of **PES University, Bengaluru** during the academic semester carried on for 8 weeks. The matter embodied in this report has not been submitted to any other university or institution for the award of any degree.

PES2UG21CS381   **Pragya Das**

ACKNOWLEDGEMENT

I would like to express my gratitude to my guide **Manikesh Verma**, Vice President at Goldman Sachs for their continuous guidance, assistance, and encouragement throughout the development of this project.

I am grateful to the internship coordinators **Prof. Animesh Giri** & **Dr.Prema R**, Dept. of Computer Science and Engineering, PES University- Electronic City Campus for organizing, managing, and helping out with the entire process.

I am grateful to the Capstone Project guide **Prof. Animesh Giri**, Dept. of Computer Science and Engineering, PES University- Electronic City Campus for organizing, managing, and helping out with the entire process.

I take this opportunity to thank **Dr. Sandesh B J**, Chairperson, Department of Computer Science and Engineering, PES University – Electronic City Campus, for all the knowledge and support I have received from the department.

I would like to thank **Dr. B.K. Keshavan**, Dean of Faculty, PES University for his help.

I am deeply grateful to **Dr. M. R. Doreswamy**, Chancellor, PES University, **Prof. Jawahar Doreswamy**, Pro-Chancellor – PES University, **Dr. Suryaprasad J**, Vice-Chancellor, PES University & **Prof.Nagarjuna Sadineni**, Pro-Vice-Chancellor, PES University for providing me with various opportunities and enlightenment every step of the way.

I would like to thank Manav Tuteja, my co-intern, who worked on this project with me.

Finally, this internship could not have been completed without the continual support and encouragement I have received from my parents and my friends.

ABSTRACT

This report provides an overview of my 8-week internship experience at Goldman Sachs, focusing on my role within the Financial Crime Compliance (FCC) department. Goldman Sachs, a global leader in financial services, is renowned for its commitment to excellence, client service, and integrity. My internship revolved around the development of a Data Dictionary project aimed at enhancing data management and transparency within the FCC department.

During the internship, my primary responsibility was to collaborate with the Compliance Engineering team to design and implement a web-based Data Dictionary. This tool was created to streamline the tracking and management of data flow across various teams within FCC, improving the firm's ability to prevent and detect financial crimes. The project involved full-stack development, utilizing technologies such as React, TypeScript, Python, Flask, and DB2.

Key accomplishments during the internship included the successful deployment of the project's initial version, positive feedback from senior FCC members, and overcoming challenges related to complex data structures and database management. The experience also provided me with valuable insights into the importance of regulatory compliance, teamwork, and the application of technical skills in a real-world setting.

In addition to technical development, the internship offered opportunities for community service, where I participated in initiatives such as crafting beds for shelter dogs and preparing food for the less privileged. These activities underscored the firm's commitment to social responsibility and community engagement.

Overall, my internship at Goldman Sachs was a transformative experience, offering professional growth, technical skill enhancement, and a deeper understanding of the financial industry's compliance landscape. I am grateful for the opportunity and look forward to applying the skills and knowledge gained in future endeavours.

Table of Contents

I. Introduction

i. __About the Organization__

Goldman Sachs is a leading global financial institution that delivers a broad range of financial services to a large and diversified client base that includes corporations, financial institutions, governments, and individuals. Founded in 1869, the firm is headquartered in New York and maintains offices in all major financial centers around the world.

i. __Purpose and Values__

Goldman Sachs aspires to be the world's most exceptional financial institution, united by their shared values of partnership, client service, integrity, and excellence. Drawing on over 150 years of experience working with the world's leading businesses, entrepreneurs, and institutions, they mobilize their people, culture, technologies, and ideas to advance the success of their clients, broaden individual prosperity, and accelerate economic progress for all.

ii. Culture of Client Service

For more than 150 years, a culture of teamwork and client service has defined the firm. Today, nearly 40,000 Goldman Sachs colleagues work together to serve clients and communities around the world, building upon a rich history of innovative ideas from extraordinary people.

ii. <u>About the Division</u>

Global Compliance:

Global Compliance manages the firm's compliance, regulatory, and reputational risks by ensuring adherence to laws, rules, and regulations. The division monitors trends and changes in regulations in all jurisdictions in which the firm does business and develops and implements firmwide and divisional policies and procedures. In addition to advising the firm's businesses, Global Compliance is responsible for managing audits and inquiries, Compliance learning, surveillance, and testing the firm's risk management infrastructure.

Compliance is organized broadly into several groups, which are embedded into the areas they support, and centralized compliance groups, which survey risks and manage regulatory affairs, services, and resources related to all businesses and employees of the firm globally. These centralized groups include:

- Control Room
- Core Compliance
- Financial Crime Compliance
- Global Compliance Employee Services
- Global Compliance Testing Group
- Regional Regulatory Affairs
- Regulatory Practice Group
- Regulatory Reporting
- Surveillance Analytics
- Engineering

iii. <u>About the Function (Engineering)</u>

Financial Crime Compliance (FCC):

Responsible for coordinating the firmwide anti-financial crime program. The team designs, develops, implements, and oversees a wide range of systems and controls designed to prevent and detect money laundering, terrorist financing, government sanctions violations, fraud, corruption, and other misconduct.

Compliance Engineering:

Plays a critical role in delivering on the strategic goals of Compliance through the development of tools that improve risk management and create operating leverage for the division.

iv. <u>Internship Overview</u>

The 8 weeks internship program at Goldman Sachs offered us a unique opportunity to engage in significant projects and gain practical insights into the workings of a top-tier financial institution. My role involved working within the FCC department, which is dedicated to managing compliance, regulatory, and reputational risks across the firm. The program emphasized real-world applications, professional development, and collaborative work environments.

II. Job Responsibilities and Duties

i. <u>Description of Responsibilities and Duties:</u>

During my 8-week internship at Goldman Sachs within the Financial Crime Compliance (FCC) department, I was responsible for several key tasks that contributed to the overall functioning of the department. My primary duty was to work on the development of the Data Dictionary project, which aimed to streamline the tracking and management of data flow across various teams within the FCC. This involved designing a user-friendly web interface and creating a database to store and retrieve data in a standardized format.

I was assigned to collaborate with my fellow intern, the Compliance Engineering team to develop the project. Specifically, our role included:

- **Frontend Development:** We built the user interface using React and TypeScript, ensuring the platform was intuitive and easy to navigate for end-users.

- **Backend Development:** We developed the server-side logic using Python and Flask, focusing on creating RESTful APIs that interact with the database.

- **Database Management:** We set up and managed the DB2 databases, where all data from different FCC teams was stored. We also wrote queries to efficiently retrieve and display this data on the front end.

ii. <u>Collaboration with Colleagues and Supervisors:</u>

Throughout the internship, I worked closely with my fellow intern, the Compliance Engineering team, the FCC team lead, and my direct supervisor. Weekly meetings were held to track progress and ensure alignment with the project's goals. I also had the opportunity to present my work to the team and received valuable feedback that helped refine the project.

III. Project

i. Introduction

Data Dictionary is being designed to support the Financial Crime Compliance (FCC)

department, which is tasked with coordinating the firm's anti-financial crime program in

adherence to the Banking Secrecy Act (BSA) and Anti-Money Laundering (AML) regulations.

The FCC department encompasses multiple teams, each of which consumes specific data feeds

from various business sources. These feeds are screened for potential financial crime history.

Given the diversity of data consumed by each team, there is a need for a system to track and

provide an overview of the data flow. The Data Dictionary project addresses this need by

providing a centralized point of access to view the data being consumed, identify its source

(upstream contact), and understand its usage. This comprehensive overview aids in maintaining

transparency and efficiency in the data flow, thereby enhancing the effectiveness of the FCC's

surveillance and solution implementation tasks.

ii. Problem Statement

- Difficulties in navigating between Confluence pages to view upstream contacts and
  downstream data consumption.
- Lack of intuitive way to correlate data across different pages.
- Anyone to add or edit data directly within the Confluence table, like an Excel
  spreadsheet.
- The data is maintained in a table format on Confluence pages without a centralized
  management system.

iii. **Objective**

The primary objective is to track and provide an overview of the data flow across various teams within the FCC department. This includes identifying the source of the data (upstream contact), understanding its usage, and viewing the data being consumed. This is achieved by creating a user-friendly web interface to view all the information concisely. Creating and managing a database to store all the information in a standardized format. This comprehensive overview aids in maintaining transparency and efficiency in the data flow, thereby enhancing the effectiveness of the FCC's surveillance and solution implementation tasks.

iv. **Technology Stack**

i. **Frontend:**

- **React:** React was used to build the user interface of the Data Dictionary project. Its component-based architecture allowed for a dynamic and responsive web application, ensuring efficient updates and rendering.
- **TypeScript:** Employed alongside React, TypeScript's static typing improved code quality and maintainability, reducing runtime errors and enabling better collaboration through clear type definitions.

ii. **Backend:**

- **Python:** Chosen for its simplicity and extensive libraries, Python handled the server-side logic, data processing, and database interaction.
- **Flask:** Chosen for its simplicity and extensive libraries, Python handled the server-side logic, data processing, and database interaction.

iii. **Database:**

- **SQLite:** Initially used for its simplicity and ease of setup, SQLite served as a lightweight, self-contained database for testing and prototyping.

- **DB2:** IBM's DB2 was selected for production due to its reliability and scalability, efficiently handling complex queries across large datasets for the FCC department.

iv. **Version Control:**

- **GIT:** Git facilitated effective collaboration and maintained a history of code changes. Its branching and merging capabilities supported parallel development, while integration with platforms like GitLab ensured seamless code reviews, issue tracking, and continuous integration.

v. **Learnings**

i. Gained hands-on experience in project initiation, pipeline setup, and deployment.

ii. Learned the importance of clean, modular code and effective testing strategies.

iii. Acquired insights into data usage for compliance and risk management across teams.

iv. Improved skills in collaboration, communication, and coordination within a team.

v. Built valuable professional connections and learned the importance of networking.

vi. Found fulfillment by balancing hard work with a positive attitude.

vii. Enhanced problem-solving skills by tackling real-world challenges and adapting quickly.

viii. Strengthened ability to work under tight deadlines while maintaining high-quality output.

ix. Enhanced adaptability by quickly learning new tools and technologies as project requirements evolved.

IV. Accomplishments and Achievements

i. Significant Achievements:

One of the major accomplishments during my internship was the successful development and deployment of the Data Dictionary's initial version. This included:

- Completing the project on time and meeting all performance targets set by my supervisor.

- Delivered a presentation to senior members of the FCC department, where I showcased the functionality of the Data Dictionary and received positive feedback.

- Successfully integrating the database with the front-end interface, allowing users to easily access and manage data.

ii. Overcoming Challenges:

- A key challenge was handling the complex data structures from various FCC teams, each with different formats and requirements. I overcame this by holding detailed discussions with team leads to understand their data needs.

- Implementing a flexible schema in the database that could accommodate diverse data types.

- Working with ibm_db commercial database and integrating it with Python.

V. Community Service

i. Crafting Beds for Street and Shelter Dogs:

i. Description:

We collaboratively craft cozy, durable beds for dogs living on the streets and in local shelters, such as Sudha and Karuna homes. Using materials supplied by Way for Life, we cut fabric, sew, and stuff beds, ensuring they are comfortable for the dogs.

ii. Rationale:

Many dogs in urban areas live in harsh conditions or overcrowded shelters. Providing handmade beds offers these animals a touch of comfort, significantly improving their living situation.

ii. Make a sandwich to feed those in need:

i. Description:

We prepared fresh food to support homeless or less privileged people. All groceries are supplied by Bhumi, and we distributed the prepared food to those in need. We also choose to accompany the Bhumi team for distribution.

ii. Rationale:

Many poor and homeless people go without the necessities of living - food. This activity allows volunteers to do cold cooking together and make sandwiches for those living on the street with hunger.

VI. Lessons Learned

i. Key Insights:

- The internship provided invaluable insights into the workings of a top-tier financial institution and the critical role compliance plays in maintaining the firm's integrity.

- Technical Growth: I developed a deeper understanding of full-stack development, particularly in integrating frontend and backend systems with a commercial database in a real-world application. The exposure to Goldman Sachs' UI Toolkit and working with Flask to create scalable web services was particularly beneficial.

- Team Dynamics: The importance of effective communication and collaboration in a team setting was a crucial learning point. I learned how to navigate different working styles and how to contribute effectively to team discussions.

- Regulatory Knowledge: I gained a better understanding of anti-financial crime regulations and the importance of data management in ensuring compliance.

ii. Application of Skills:

Moving forward, I plan to apply these technical and soft skills in future projects, whether in academic settings or professional environments. I aim to continue refining my coding practices and furthering my knowledge in compliance and financial technologies.

iii. Areas for Improvement:

While I gained a lot from the internship, I identified the need to further develop my skills in large-scale database management and regulatory compliance. I plan to pursue additional courses and certifications to strengthen these areas.

VII. Conclusion

i. Summary:

My internship at Goldman Sachs was a rewarding experience that allowed me to grow both professionally and personally. I was able to contribute meaningfully to the Financial Crime Compliance department, particularly through the successful completion of the Data Dictionary project. The challenges I faced and the accomplishments I achieved have given me a clearer understanding of my career goals and the areas I need to focus on for future development.

ii. Gratitude:

I would like to extend my deepest gratitude to Goldman Sachs for the opportunity to intern with such a prestigious organization. Special thanks go to my supervisor and the Compliance Engineering team, whose guidance and support were invaluable. I also appreciate the collaborative environment provided by my colleagues, which made the internship an enriching experience.

iii. Recommendations:

Based on my experience, I recommend that future internship programs at Goldman Sachs continue to focus on hands-on project work, as it provides interns with practical experience and a sense of accomplishment. They also provide frequent feedback sessions which helps interns align better with the organization's goals and expectations.

For any further communication, please feel free to reach out to me at pragyadas004@gmail.com or connect with my supervisor, Manikesh Verma, at Manikesh.Verma@ny.email.gs.com.