Industrial Internship Report on

” Financial Services”

Prepared by

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Executive Summary
This report provides details of the Industrial Internship provided by upskill Campus and The IoT Academy in collaboration with Industrial Partner UniConverge Technologies Pvt Ltd (UCT). This internship was focused on Financial Services project provided by UCT. We had to finish the project including the report in 6 weeks’ time. My project was a cloud-based solution for financial services can help banks and other financial institutions to securely manage and process large amounts of financial data. This project can be built using platforms like AWS or Google Cloud and can include features like fraud detection, customer relationship management, and accounting. This internship gave me a very good opportunity to get exposure to Industrial problems and design/implement solution for that. It was an overall great experience to have this internship.

Objective:

To design and develop a cloud-based financial services platform that provides a secure and scalable solution for banks and financial institutions to manage and process large amounts of financial data.

Features:

1. Fraud Detection: A machine learning-based fraud detection system that analyzes transaction data to identify suspicious activity.
2. Customer Relationship Management: A system that manages customer data, including account information, transaction history, and customer interactions.
3. Accounting: A system that manages account balances, processes transactions, and generates financial reports.

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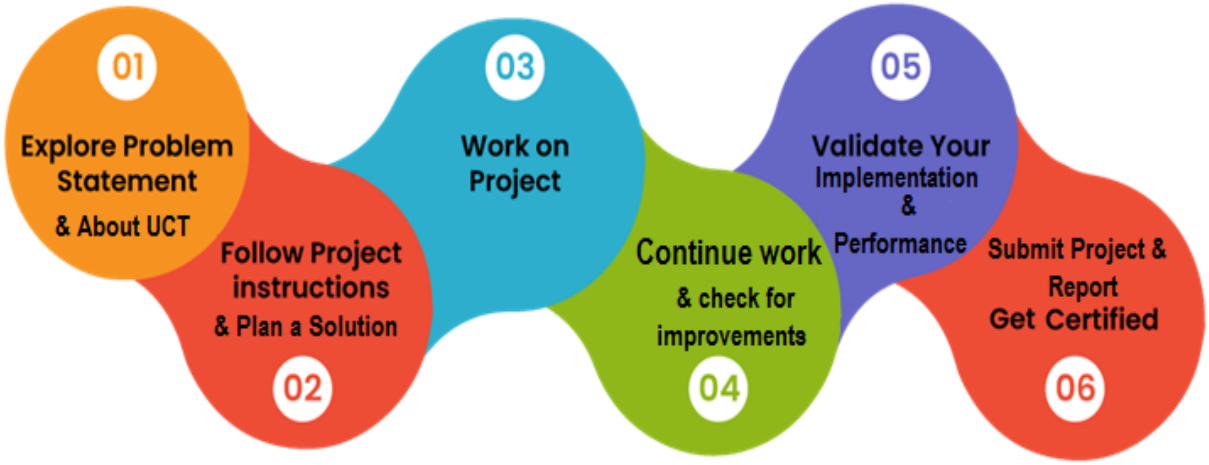
1 Preface

The cloud-based financial services project is a scalable and secure solution for banks and financial institutions to manage and process large amounts of financial data. The platform features fraud detection, customer relationship management, and accounting systems, built using AWS Lambda, API Gateway, DynamoDB, S3, and CloudWatch. The architecture is designed to handle high volumes of data and traffic, while ensuring robust security and compliance with regulatory requirements. The benefits of the platform include scalability, cost-effectiveness, and improved customer experience. However, the project also poses challenges such as data integration, security and compliance, and scalability and performance. Future development plans include integrating machine learning algorithms, developing a mobile app, and exploring blockchain integration to further enhance the platform's capabilities. Overall, the project aims to provide a unified and efficient financial services platform that meets the evolving needs of banks and financial institutions.



Throughout this project, I gained valuable insights and learned several key takeaways. One of the most significant learnings was the importance of scalability and security in cloud-based financial services. I realized that designing a system that can handle high volumes of data and traffic while ensuring robust security and compliance with regulatory requirements is crucial for success.

I also learned about the benefits of using serverless computing with AWS Lambda, which allowed for greater flexibility and cost savings. Additionally, I gained hands-on experience with AWS API Gateway, DynamoDB, S3, and CloudWatch, which further solidified my understanding of cloud-based architecture.

Another key learning was the importance of data integration and the challenges that come with it. I realized that integrating data from multiple sources and systems requires careful planning and execution to ensure data consistency and accuracy.

From an overall experience perspective, I found this project to be both challenging and rewarding. It pushed me to think critically and creatively to overcome the technical hurdles that arose during development. I enjoyed working with the latest technologies and collaborating with the team to bring this project to life.

One of the most rewarding aspects of this project was seeing the platform come together and realizing the potential impact it could have on the financial services industry. I feel proud to have been a part of this project and am excited to apply the skills and knowledge I gained to future projects.

2 Introduction

2.1 About UniConverge Technologies Pvt Ltd

A company established in 2013 and working in Digital Transformation domain and providing Industrial solutions with prime focus on sustainability and RoI.

For developing its products and solutions it is leveraging various **Cutting Edge Technologies e.g. Internet of Things (IoT), Cyber Security, Cloud computing (AWS, Azure), Machine Learning, Communication Technologies (4G/5G/LoRaWAN), Java Full Stack, Python, Front end** etc.

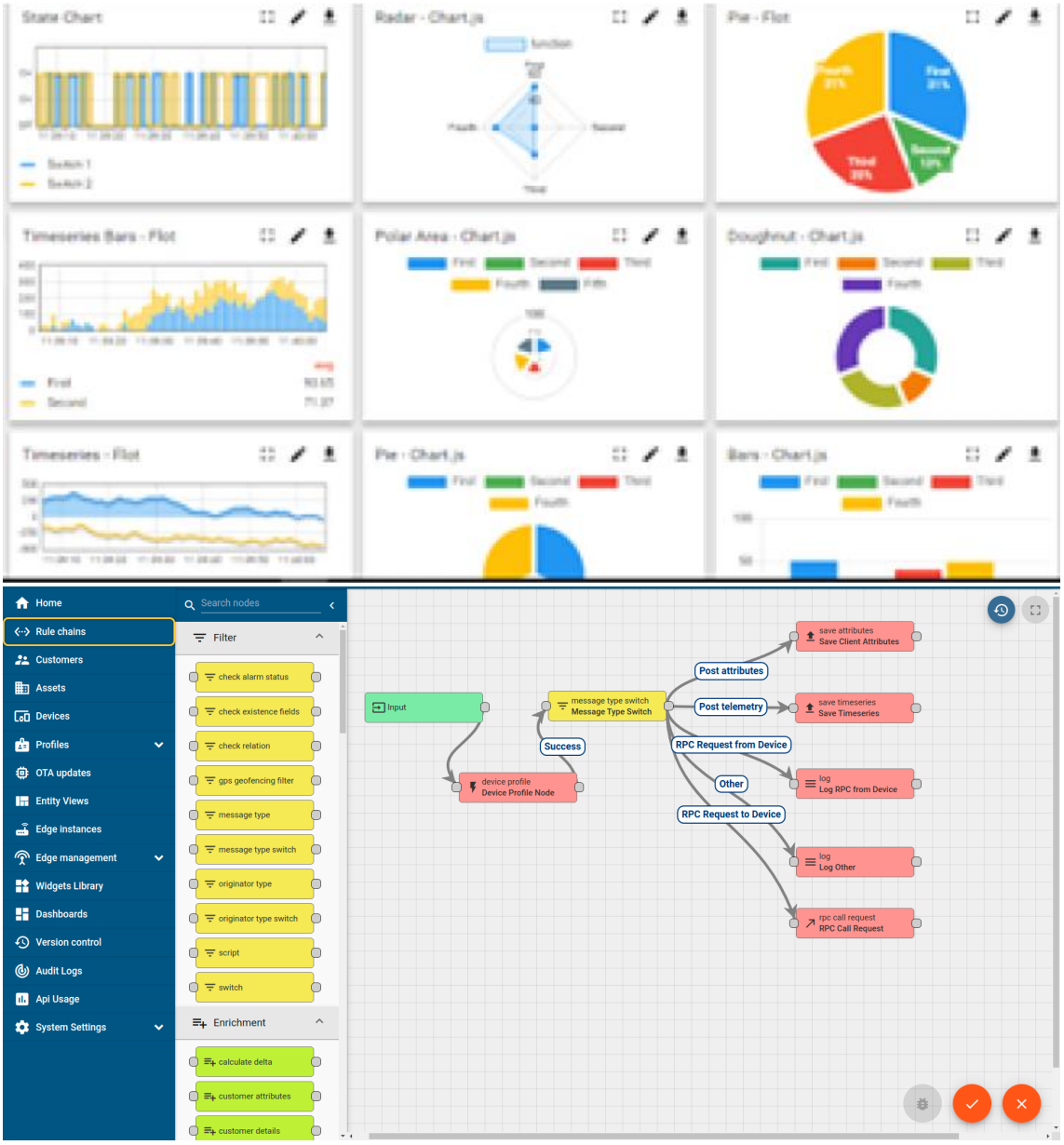
i. UCT IoT Platform (UCT Insight)

UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- It enables device connectivity via industry standard IoT protocols - MQTT, CoAP, HTTP, Modbus TCP, OPC UA
- It supports both cloud and on-premises deployments.

It has features to

- Build Your own dashboard
- Analytics and Reporting
- Alert and Notification
- Integration with third party application(Power BI, SAP, ERP)
- Rule Engine



ii. Smart Factory Platform (FACTORY WATCH)

Factory watch is a platform for smart factory needs.

It provides Users/ Factory

- with a scalable solution for their Production and asset monitoring
- OEE and predictive maintenance solution scaling up to digital twin for your assets.
- to unleased the true potential of the data that their machines are generating and helps to identify the KPIs and also improve them.
- A modular architecture that allows users to choose the service that they what to start and then can scale to more complex solutions as per their demands.

Its unique SaaS model helps users to save time, cost and money.

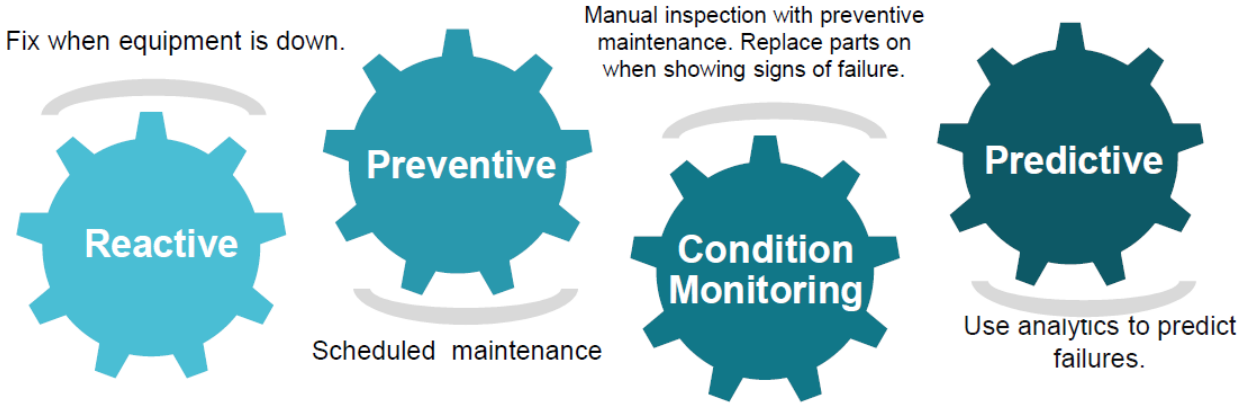
Machine	Operator	Work Order ID	Job ID	Job Performance	Job Progress		Output		Rejection	Time (mins)				Job Status	End Customer
					Start Time	End Time	Planned	Actual		Setup	Pred	Downtime	Idle		
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i

iii. LoRaWAN based Solution

UCT is one of the early adopters of LoRAWAN teschnology and providing solution in Agritech, Smart cities, Industrial Monitoring, Smart Street Light, Smart Water/ Gas/ Electricity metering solutions etc.

iv. Predictive Maintenance

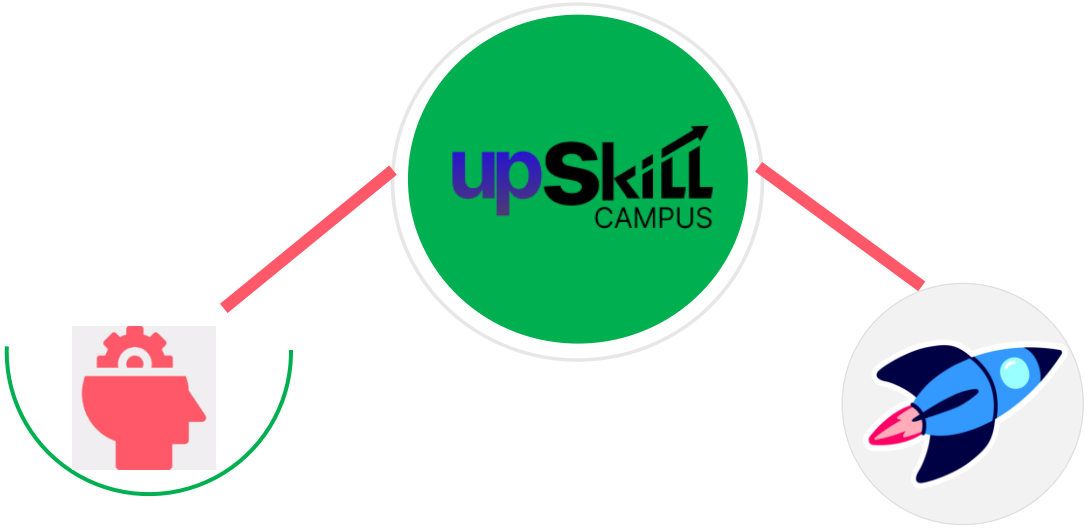
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



2.2 About upskill Campus (USC)

upskill Campus along with The IoT Academy and in association with Uniconverge technologies has facilitated the smooth execution of the complete internship process.

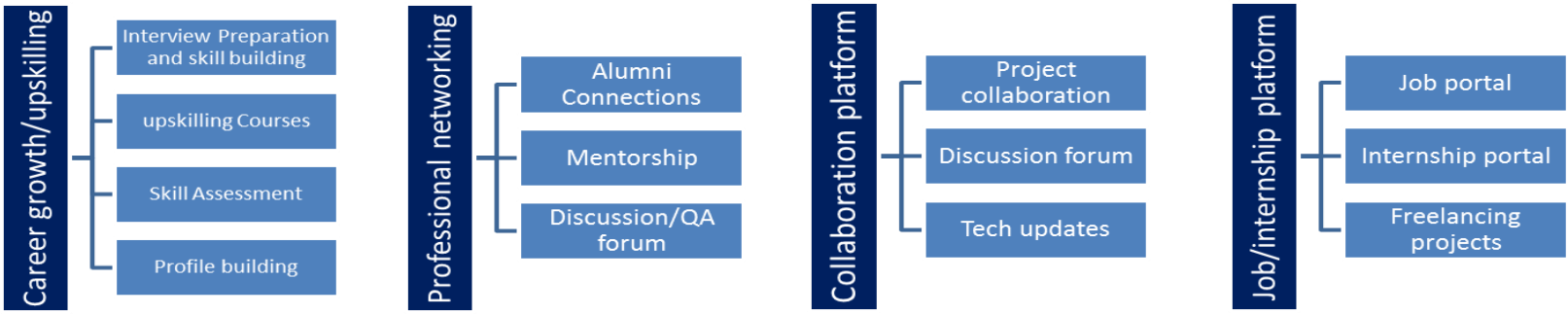
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



Seeing need of upskilling in self paced manner along-with additional support services e.g. Internship, projects, interaction with Industry experts, Career growth Services

upSkill Campus aiming to upskill 1 million learners in next 5 year

https://www.upskillcampus.com/



2.3 The IoT Academy

The IoT academy is EdTech Division of UCT that is running long executive certification programs in collaboration with EICT Academy, IITK, IITR and IITG in multiple domains.

2.4 Objectives of this Internship program

The objective for this internship program was to

- ☛ get practical experience of working in the industry.
- ☛ to solve real world problems.
- ☛ to have improved job prospects.
- ☛ to have Improved understanding of our field and its applications.
- ☛ to have Personal growth like better communication and problem solving.

2.5 Reference

[1] https://aws.amazon.com/financial-services/

[2] https://aws.amazon.com/machine-learning/financial-services/

[3] https://aws.amazon.com/solutions/case-studies/financial-services/

2.6 Glossary

Terms	Acronym
API Gateway	Managed service for creating and managing APIs.
AWS Lambda	Serverless compute service for running code.
CloudWatch	Monitoring and logging service for application performance.
DynamoDB	Fast, fully managed NoSQL database service.
S3	Object storage service for data.

3 Problem Statement

A cloud-based solution for financial services can help banks and other financial institutions to securely manage and process large amounts of financial data. This project can be built using platforms like AWS or Google Cloud and can include features like fraud detection, customer relationship management, and accounting.

Problem:

Banks and other financial institutions struggle to manage and process large amounts of financial data in a secure and efficient manner.

Current Challenges:

- Managing large amounts of financial data is a complex task
- Ensuring the security and integrity of this data is a top priority
- Traditional on-premises solutions may not be scalable or flexible enough to meet the needs of modern financial institutions

Proposed Solution:

A cloud-based solution for financial services can help address these challenges. This solution can be built using cloud platforms like AWS or Google Cloud, which offer:

- Scalability and flexibility to handle large amounts of data
- Advanced security features to protect sensitive financial data
- Cost-effective and efficient processing capabilities

Key Features:

The cloud-based solution can include features such as:

- **Fraud Detection:** Advanced algorithms and machine learning models to identify and prevent fraudulent transactions
- **Customer Relationship Management (CRM):** Tools to manage customer interactions, accounts, and data
- **Accounting:** Automated accounting and bookkeeping systems to streamline financial processes

Benefits:

The cloud-based solution can provide numerous benefits to banks and financial institutions, including:

- Improved data security and compliance
- Increased efficiency and scalability
- Enhanced customer experience through better CRM and fraud detection
- Cost savings through reduced infrastructure and maintenance costs

Overall, the problem statement is proposing a cloud-based solution to help financial institutions manage and process large amounts of financial data in a secure, efficient, and scalable manner.

4 Existing and Proposed solution

Existing Solution 1: On-Premises Infrastructure

- Description: Financial institutions manage their own on-premises infrastructure, including servers, storage, and databases.
- Limitations: High maintenance costs, limited scalability, and security risks.

Proposed Solution 1: Cloud-Based Infrastructure (IaaS)

- Description: Financial institutions can migrate their infrastructure to a cloud-based Infrastructure-as-a-Service (IaaS) model, such as AWS or Google Cloud.
- Benefits: Scalability, cost savings, and enhanced security features.

Existing Solution 2: Manual Fraud Detection

- Description: Financial institutions use manual processes to detect and prevent fraudulent transactions, relying on human analysis and review.
- Limitations: Time-consuming, prone to human error, and limited scalability.

Proposed Solution 2: Machine Learning-Based Fraud Detection

- Description: Implement machine learning algorithms and models to detect and prevent fraudulent transactions in real-time, using cloud-based services like AWS SageMaker or Google Cloud AI Platform.
- Benefits: Improved accuracy, increased efficiency, and enhanced customer experience.

Existing Solution 3: Disparate Customer Data

- Description: Financial institutions store customer data in disparate systems, making it difficult to get a unified view of customer relationships.
- Limitations: Inefficient, prone to data inconsistencies, and limited customer insights.

Proposed Solution 3: Cloud-Based Customer Relationship Management (CRM)

- Description: Implement a cloud-based CRM system, such as Salesforce or Microsoft Dynamics, to unify customer data and provide a single view of customer relationships.
- Benefits: Improved customer insights, enhanced customer experience, and increased sales and revenue.

Existing Solution 4: Manual Accounting and Bookkeeping

- Description: Financial institutions use manual processes for accounting and bookkeeping, relying on spreadsheets and manual data entry.
- Limitations: Time-consuming, prone to errors, and limited visibility into financial performance.

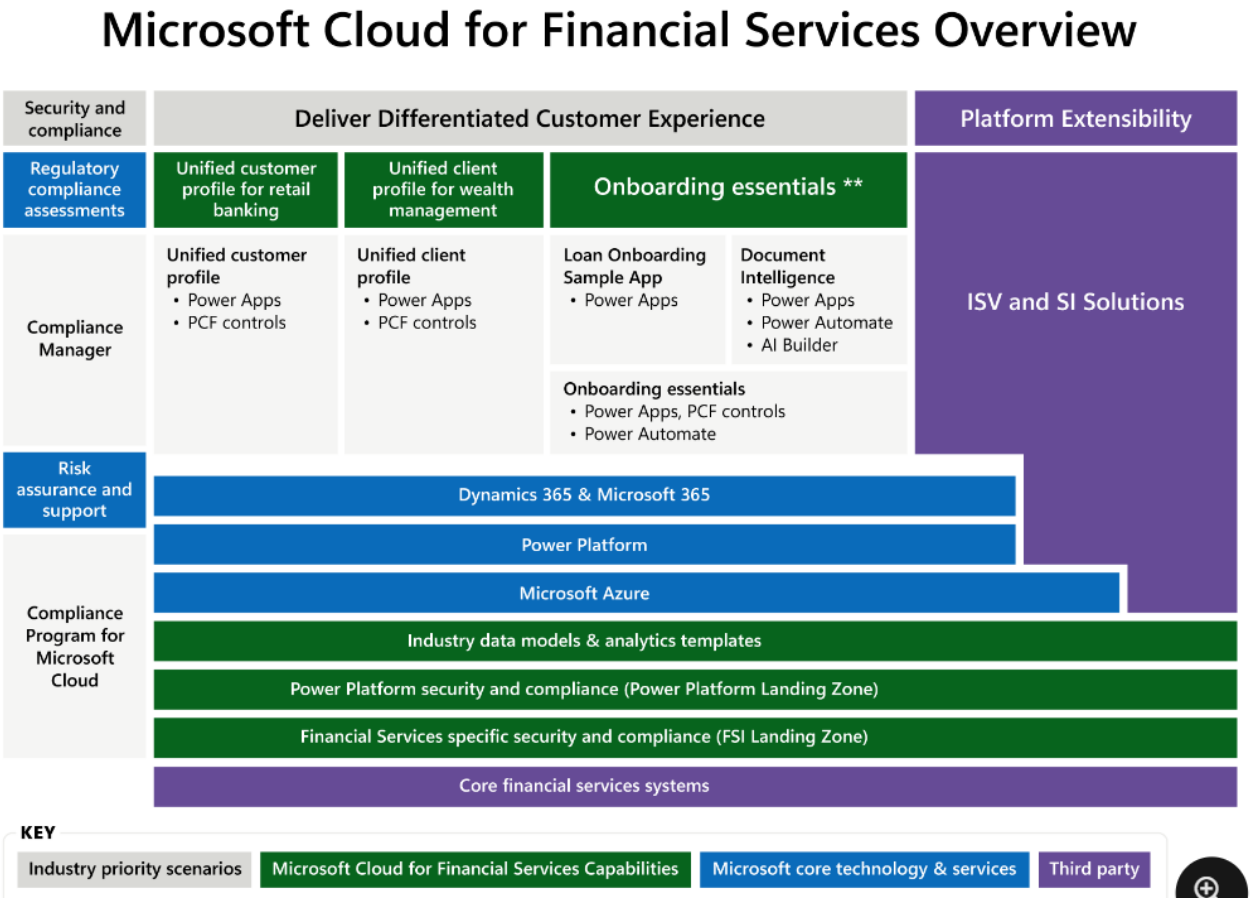
Proposed Solution 4: Cloud-Based Accounting and Bookkeeping

- Description: Implement cloud-based accounting and bookkeeping systems, such as QuickBooks or Xero, to automate financial processes and provide real-time visibility into financial performance.
- Benefits: Improved accuracy, increased efficiency, and enhanced financial visibility.

4.1 Code submission (Github link)

4.2 Report submission (Github link) : first make placeholder, copy the link.

5 Proposed Design/ Model



6 Performance Test

Performance testing is a crucial aspect of ensuring the reliability and scalability of a cloud-based financial services project. Here are some popular performance testing methodologies and tools that can be used for this project:

Methodologies:

1. **Load Testing**: This involves simulating a large number of users interacting with the application to test its performance under heavy loads.
2. **Stress Testing**: This involves pushing the application beyond its breaking point to identify its limitations and weaknesses.
3. **Endurance Testing**: This involves testing the application's performance over an extended period to identify any memory leaks or performance degradation.
4. **Spike Testing**: This involves testing the application's performance by suddenly increasing the load to identify its ability to handle sudden spikes in traffic.

8 My learnings

Throughout this project, I have gained valuable insights and learned several key takeaways that will benefit me in my future endeavors. One of the most significant learnings was the importance of thorough planning and requirements gathering. By taking the time to carefully understand the project's objectives and requirements, I was able to design and implement a scalable and efficient architecture

9 Future work scope

9.1.1 Short-term Goals

- **Enhance Model Accuracy**: Continuously collect and incorporate new data to improve the model's accuracy and robustness.
- **Expand Feature Set**: Integrate additional features and functionalities to provide a more comprehensive solution for users.
- **Optimize Performance**: Further optimize the system's performance to handle increased traffic and user activity.

- **Long-term Goals**
- **Integrate with Other Systems**: Explore opportunities to integrate the system with other financial services and platforms to create a seamless user experience.
- **Develop Advanced Analytics**: Develop advanced analytics capabilities to provide users with deeper insights and trends in their financial data.
- **Explore New Markets**: Investigate the potential to expand the system to new markets and regions, adapting to local regulations and requirements.