

Industrial Internship Report on "Cloud Computing for Rural Banking (Finance services)"

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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 a project/problem statement provided by UCT. We had to finish the project including the report in 6 weeks' time.

My project was on the Cloud Computing for Rural Banking (Finance services).

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.

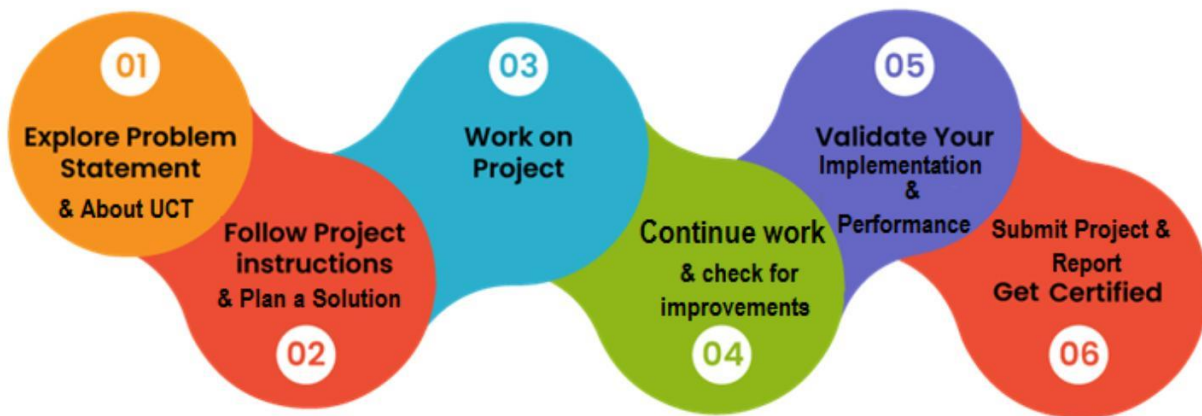
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1 Preface

- **Summary :**

This project demonstrates the potential of cloud computing to revolutionize rural banking, making financial services more accessible and efficient.



- **Outcomes:**

- Successful implementation of a cloud-based solution for rural banking.
- Improved efficiency and accessibility of banking services in rural areas.
- Enhanced security and compliance with financial regulations.

- **Learning:**

- Hands-on experience with cloud technologies and their application in the financial sector.
- Understanding the unique challenges of rural banking and how technology can address them.
- Skills in project management, system design, development, and deployment.

Thanks to all, who have helped you directly or indirectly.

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.



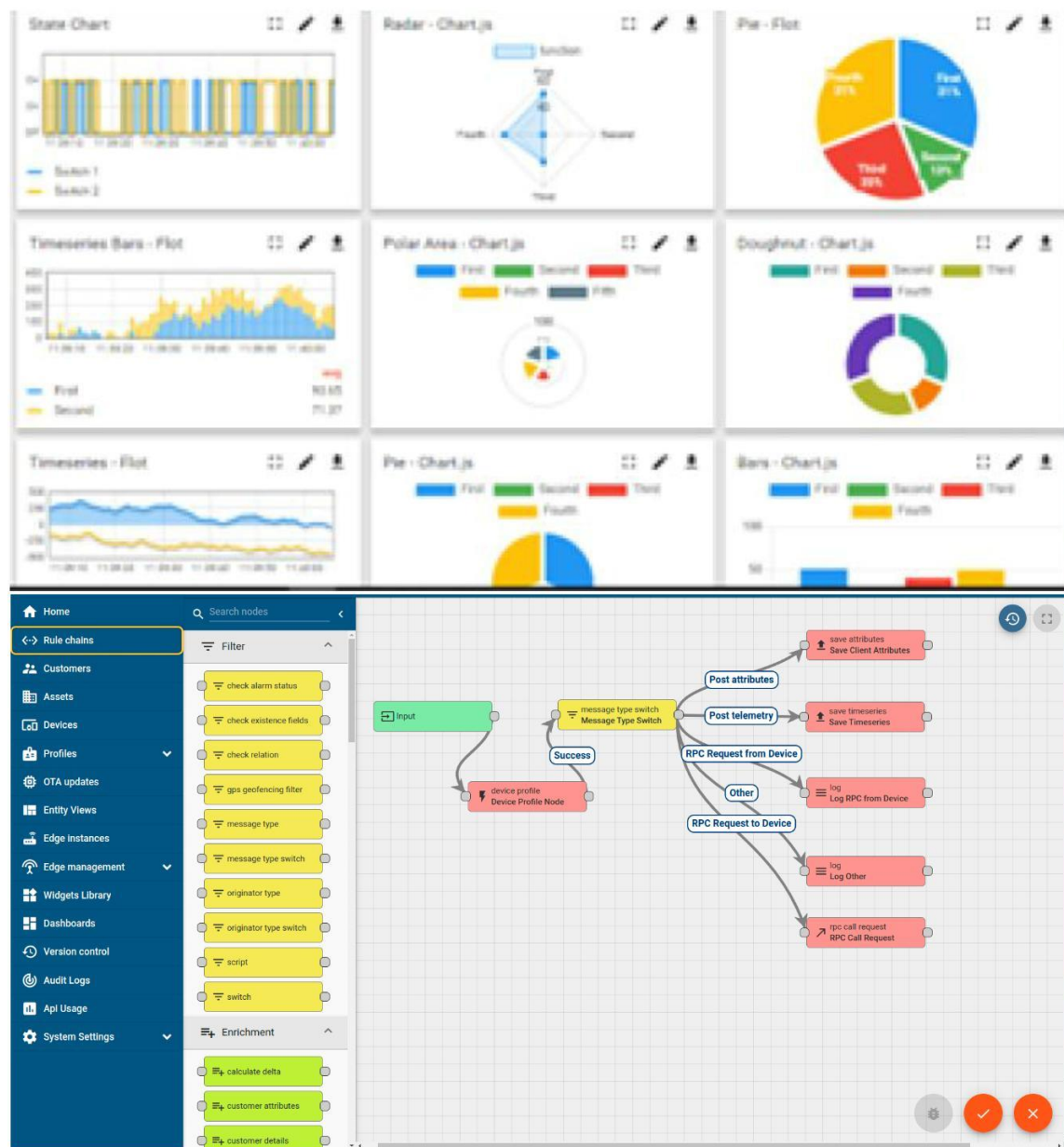
i. UCT IoT Platform ()

UCT Insight 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



FACTORY WATCH

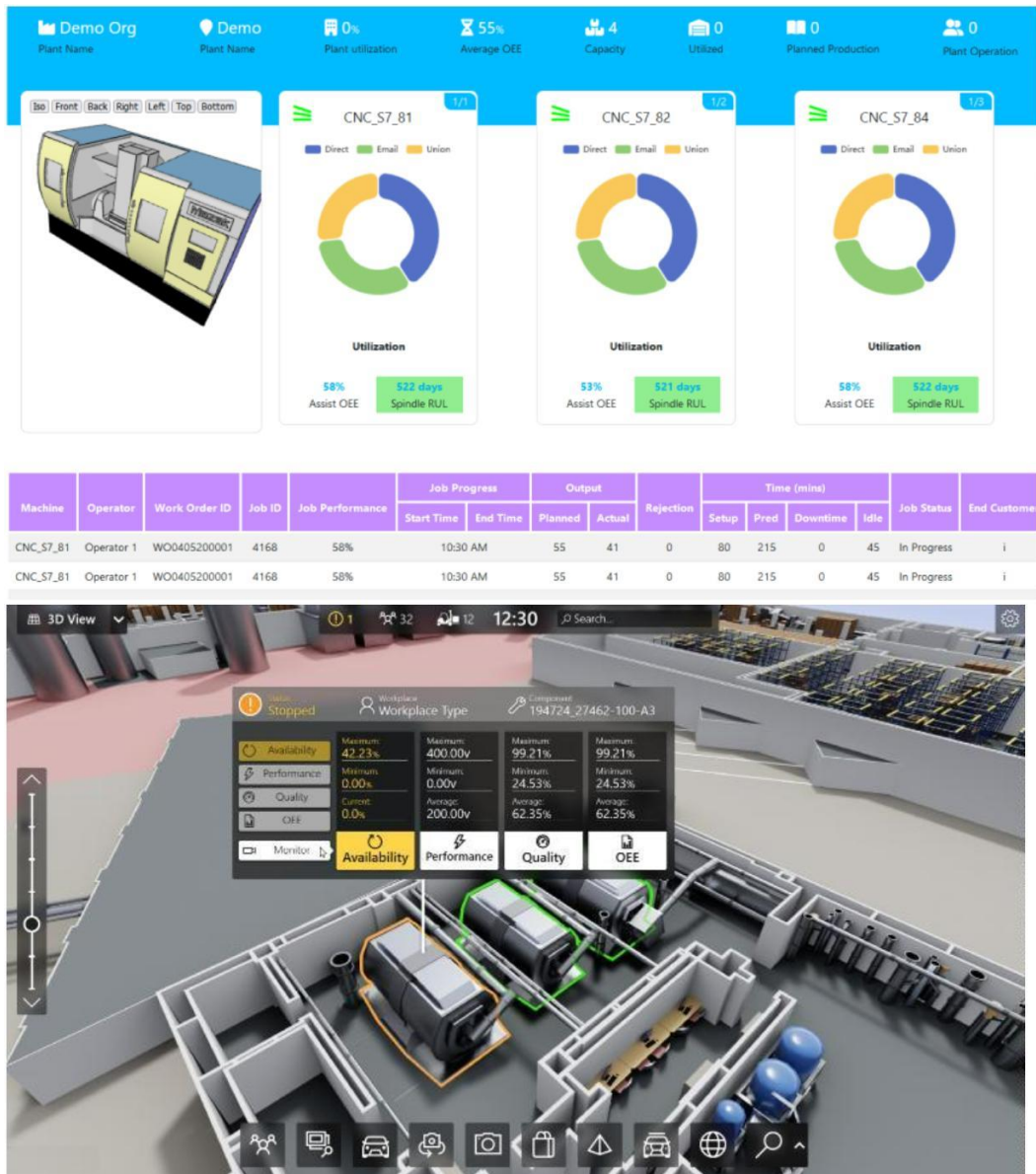
ii. Smart Factory Platform ()

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 unleash 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 want 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.



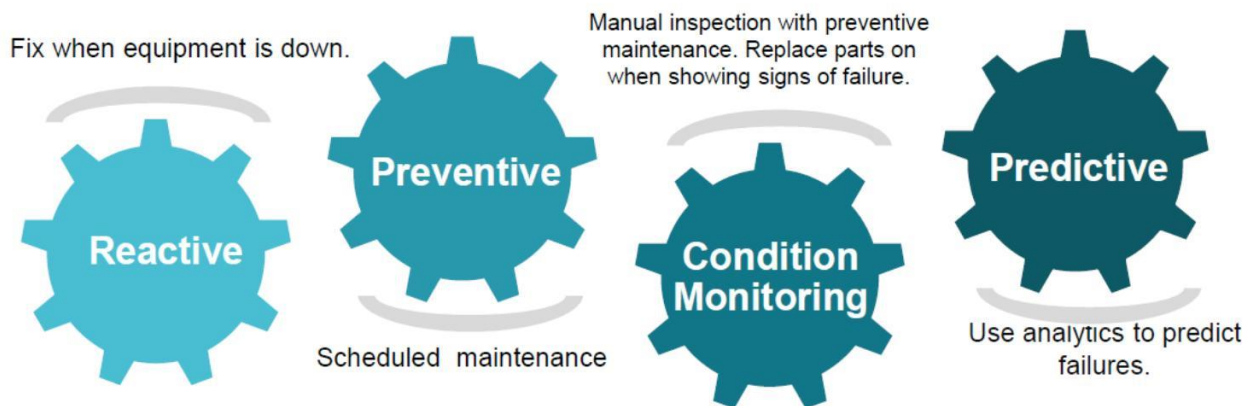


iii. LoRaWAN based Solution

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

iv. Predictive Maintenance

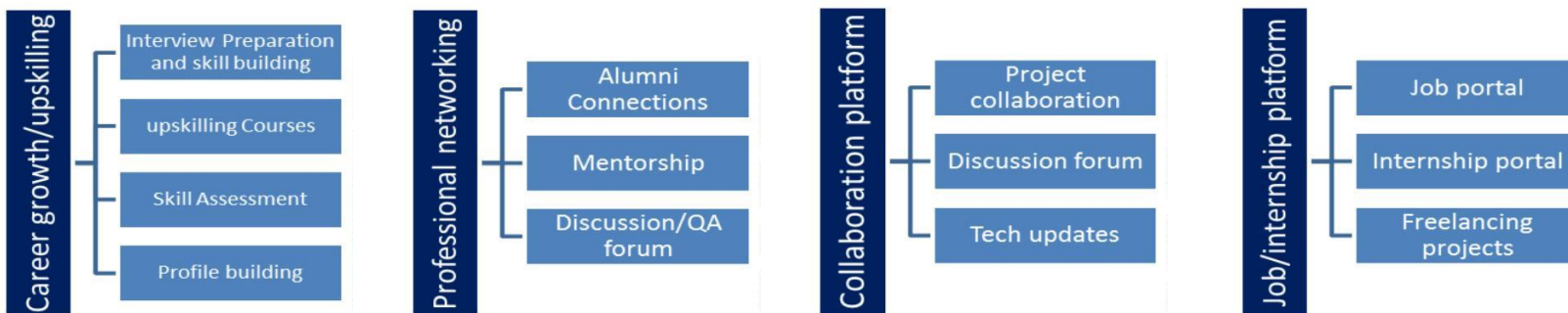
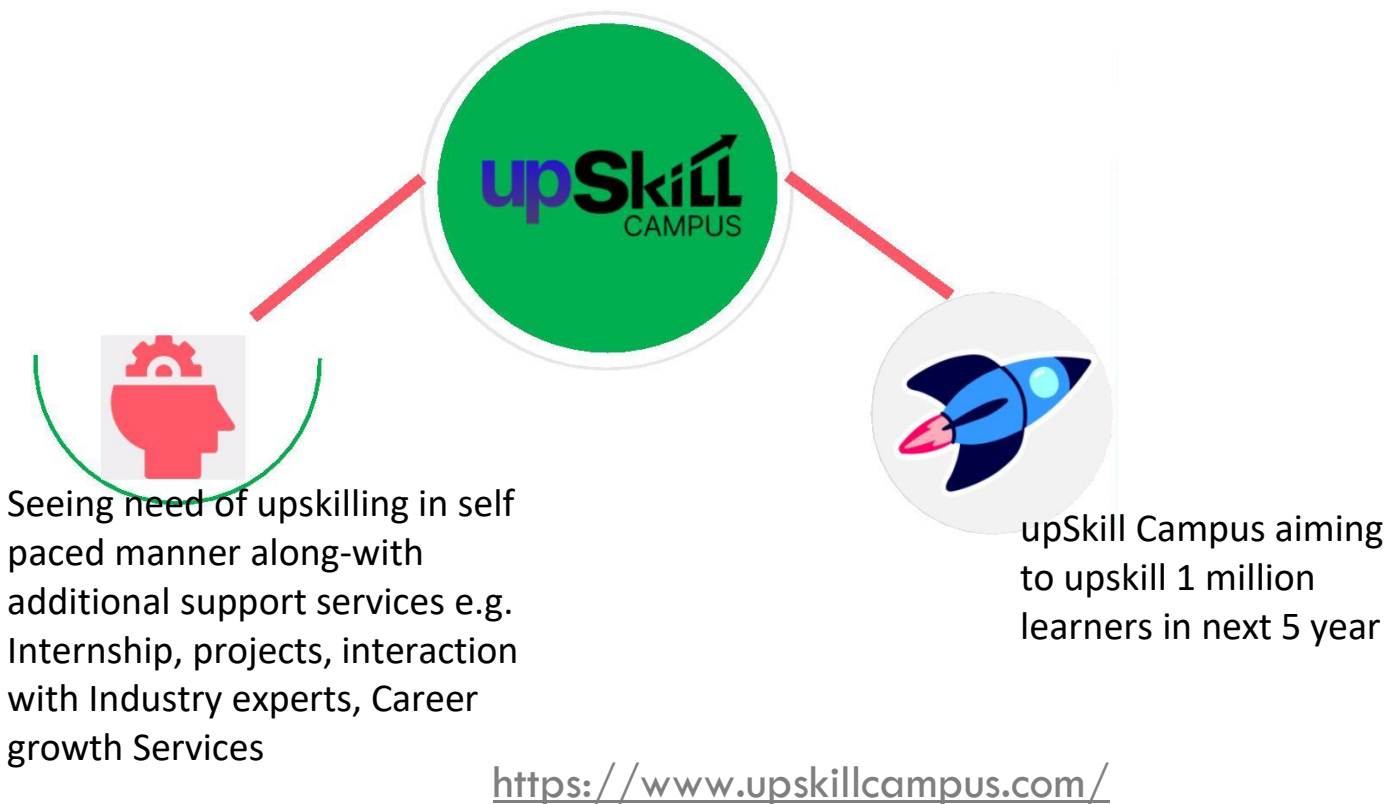
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



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.



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://www.interviewbit.com/blog/cloud-computing-project/>

3 Problem Statement

Financial Services:

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.

4 Existing and Proposed solution

Provide summary of existing solutions provided by others, what are their limitations?

What is your proposed solution?

What value addition are you planning?

4.1 Code submission

<https://github.com/coder-107/upskillCampus.git>

4.2 Report submission (Github link) :

<https://github.com/coder-107/upskillCampus.git>

5 Proposed Design/ Model

Given more details about design flow of your solution. This is applicable for all domains. DS/ML Students can cover it after they have their algorithm implementation. There is always a start, intermediate stages and then final outcome.

5.1 High Level Diagram (if applicable)

Figure 1: HIGH LEVEL DIAGRAM OF THE SYSTEM

5.2 Low Level Diagram (if applicable)

5.3 Interfaces (if applicable)

Update with Block Diagrams, Data flow, protocols, FLOW Charts, State Machines, Memory Buffer Management.

Performance Test

This is very important part and defines why this work is meant of Real industries, instead of being just academic project.

Here we need to first find the constraints.

How those constraints were taken care in your design?

What were test results around those constraints?

Constraints can be e.g. memory, MIPS (speed, operations per second), accuracy, durability, power consumption etc.

In case you could not test them, but still you should mention how identified constraints can impact your design, and what are recommendations to handle them.

5.4 Test Plan/ Test Cases

5.5 Test Procedure

5.6 Performance Outcome

6 My learning :

1. **Effective Planning and Research:**

- Initial planning and thorough research are crucial for understanding project requirements and setting a clear direction.

2. **Collaboration and Communication:**

- Regular communication and collaboration among team members and stakeholders ensure that challenges are addressed promptly and effectively.

3. **User-Centric Development:**

- Incorporating user feedback throughout the development process leads to a more user-friendly and successful product.

4. **Continuous Improvement:**

- Regular testing, monitoring, and iteration are essential for maintaining performance and security in a cloud-based application.

5. **Adaptability and Flexibility:**

- Being adaptable and flexible in the face of changing requirements and unforeseen challenges is key to project success.

6. **Security as a Priority:**

- Continuous focus on security ensures the protection of sensitive financial data and builds trust with users.

By reflecting on these learnings, the team is well-equipped to tackle future challenges and continue to enhance the Financial Services Cloud Computing Project for rural banking.

7 Future work scope

1. Feature Expansion:

- **Advanced Financial Services:** Introduce new services such as microloans, insurance products, and personalized financial advisory.
- **AI and Machine Learning:** Implement AI-driven analytics for personalized financial insights, fraud detection, and credit scoring.

2. Mobile Application Development:

- **Native Apps:** Develop native mobile applications for Android and iOS to enhance accessibility for rural users.
- **Offline Capabilities:** Implement offline functionalities to cater to users with intermittent internet connectivity.

3. Scalability and Performance Optimization:

- **Enhanced Scalability:** Utilize containerization and orchestration tools like Kubernetes to manage scaling more efficiently.
- **Performance Tuning:** Continuously optimize the system for speed and reliability to handle increasing user loads and transaction volumes.

4. Security and Compliance:

- **Advanced Security Measures:** Implement advanced security protocols, such as biometric authentication and blockchain for secure transactions.
- **Regulatory Compliance:** Ensure ongoing compliance with evolving financial regulations and standards, such as PSD2 and GDPR.

5. User Experience Improvements:

- **UI/UX Enhancements:** Continuously improve the user interface and experience based on user feedback and usability testing.
- **Localization:** Expand language support and culturally relevant interfaces to cater to diverse rural populations.

6. Integration with Government Services:

- **Subsidies and Grants:** Integrate with government systems to facilitate access to subsidies, grants, and other financial aid directly through the platform.
- **Digital Identity Verification:** Utilize government-provided digital identity verification systems to streamline the onboarding process.

7. Partnerships and Collaborations:

- **Financial Institutions:** Partner with local banks and microfinance institutions to expand service offerings and reach.
- **Technology Providers:** Collaborate with tech providers for advanced features like AI, blockchain, and IoT integration.

8. Educational Initiatives:

- **Financial Literacy Programs:** Develop and integrate educational modules to improve financial literacy among rural users.
- **Community Engagement:** Conduct outreach programs to educate rural communities about the benefits and usage of digital financial services.

9. Sustainability and Social Impact:

- **Green Computing:** Adopt sustainable cloud practices to minimize environmental impact.
- **Social Impact Measurement:** Implement tools to measure and report on the social impact of the platform on rural communities.

10. Continuous Innovation:

- **R&D Investments:** Invest in research and development to explore new technologies and innovative solutions that can enhance the platform.
- **User-Centric Innovations:** Regularly engage with users to identify emerging needs and develop innovative features that address those needs.

By focusing on these future work areas, the Financial Services Cloud Computing Project can significantly enhance its value proposition, broaden its reach, and continue to support the financial inclusion and empowerment of rural populations.