Research Plan – Plaid banking services

Balan Mihai-Stefan – Software Advanced

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# Introduction

The main topic of this research is to understand how to integrate Plaid services into a personal finance application, what are the security concerns and how to handle the Plaid API connections in a deployed environment. While developing the application strictly the sandbox mode of Plaid will be used as the project has no allocated budget, inducing some limitations that also need to be investigated.

# Research questions

The main research question that will be the focus of this document:

* How can Plaid services be effectively integrated into a personal finance application while addressing security concerns, managing API connections in a deployed environment, and overcoming the limitations of the sandbox mode?

The research questions that need to be addressed within this topic are the following:

1. How the following functionality be implemented using Plaid: Syncing a user account with a bank account and fetching the transaction history?
2. What are the security concerns associated with using Plaid services?
3. How can Plaid API connections be managed in a deployed environment?
4. What limitations are imposed by using the sandbox mode of Plaid, and how can they be addressed?

# Methodology

Using the DOT Framework for research, the approach for each research question is as follows:

1. How the following functionality be implemented using Plaid: Syncing a user account with a bank account and fetching the transaction history**?**
   * **Library**: Outline the architecture of the personal finance application, focusing on where and how Plaid services will be integrated.
   * **Workshop**: Develop a prototype that integrates Plaid services, documenting the steps and challenges encountered during the integration process.
   * **Test**: Conduct functionality tests to ensure that Plaid services are correctly integrated and perform as expected within the application.
2. **What are the security concerns associated with using Plaid services?**
   * **Library**: Identify potential security vulnerabilities in the integration of Plaid services, including data transmission and storage.
   * **Workshop**: Implement security measures such as encryption, secure authentication, and regular security audits.
   * **Test**: Perform security testing, including penetration testing and vulnerability assessments, to evaluate the effectiveness of the implemented security measures.
3. **How can Plaid API connections be managed in a deployed environment?**
   * **Library**: Develop a strategy for managing Plaid API connections, including error handling, rate limiting, and connection monitoring.
   * **Workshop**: Implement the connection management strategy in the deployed environment, ensuring that it aligns with best practices and Plaid's guidelines.
   * **Test**: Monitor the performance and reliability of the API connections, making adjustments as necessary based on real-world usage and feedback.
   * **Feedback**: Consult on the results with the research supervisors (project stakeholders), receive feedback and implement it for the final API strategy
4. **What limitations are imposed by using the sandbox mode of Plaid, and how can they be addressed?**
   * **Academic Research**: Identify the limitations of the sandbox mode, such as data constraints and lack of real-world transactions.
   * **Workshop**: Develop workarounds or alternative solutions to mitigate the impact of these limitations during development and testing.
   * **Test**: Evaluate the effectiveness of the workarounds and ensure that the application can transition smoothly from sandbox to production mode.
   * **Feedback**: Consult on the results with the research supervisors (project stakeholders), receive feedback on the project limitations and discuss proceedings.

# Expected Outcome

1. Integration of Plaid Services: A functional prototype of the personal finance service with integrated Plaid services is created, demonstrating seamless data retrieval and user account linking.
2. Security Measures: A comprehensive security framework that addresses potential vulnerabilities is developed, focusing on secure data transmission and storage.
3. API Connection Management: A robust strategy for managing Plaid API connections is created and validated, ensuring high reliability and performance in a deployed environment is discovered.
4. Mitigation of Sandbox Limitations: Effective workarounds are devised for the limitations of the sandbox mode, enabling a smooth transition to production with minimal adjustments.