EMPRESTA.ME: Distributed application for goods sharing anchored in a reputation system

João Correia (104360), Bruno Moura (97151), Inês Castro (98384), Rafael Remígio (102435), Diogo Silva (103925)
Orientador: Prof. André Zúquete

Projeto em Engenharia Informática, 3º ano, LEI.

2023

Abstract

This project focuses on the development of the EMPRESTA.ME platform, a proof-of-concept system designed to facilitate the sharing of underutilized physical goods among individuals and organizations. The platform aims to address the challenges of limited awareness and trustworthiness assessment in the lending process. EMPRESTA.ME leverages a distributed architecture and integrates a Reputation System with an algorithm to assess user trustworthiness through vouches. This enables effective connections between item owners and individuals in need, promoting efficient goods sharing within the platform. This report provides a comprehensive overview of the development process, including requirements gathering, system design, and implementation.

By adopting a proof-of-concept approach, our project aims to showcase the feasibility of a distributed asset sharing system supported by a robust Reputation System. Additionally, our work provides valuable insights for future advancements and practical applications in real-life lending scenarios.

Methods

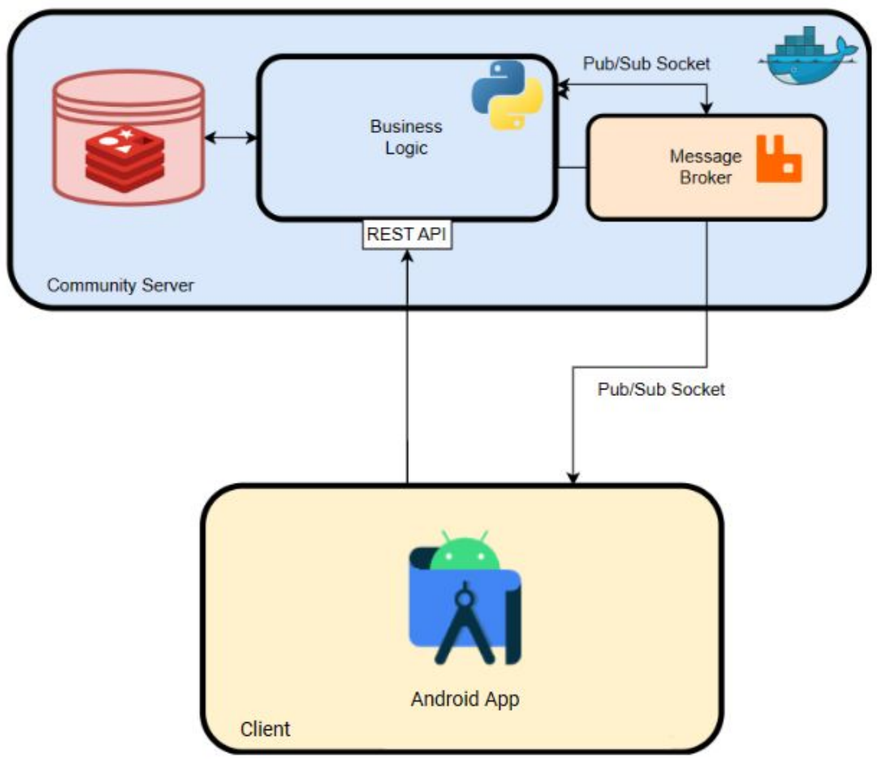

Fig 1 - Proposed System Architecture.

- Developed the Native Android app, ensuring a user-friendly interface for seamless item sharing and community management.
- Implemented the backend software solution in Python, incorporating the designed communication protocol and integrating the Vouch Reputation System (VRS).
- Integrated the RabbitMQ message broker to enable reliable communication between different system modules.
- Configured the Redis database to store and retrieve data efficiently.
- Implemented robust security with authentication, authorization, encryption, digital signatures and a Proof of Work (PoW) mechanism.
- Through this process, we ensured that every node in the network maintained a complete record of all transactions.

Vouch Reputation System (VRS)

The Vouch Reputation System algorithm – written in Python – utilizes social connections and vouching to calculate reputation scores that reflect trust and reliability within the community, enabling informed decision-making and fostering accountability.

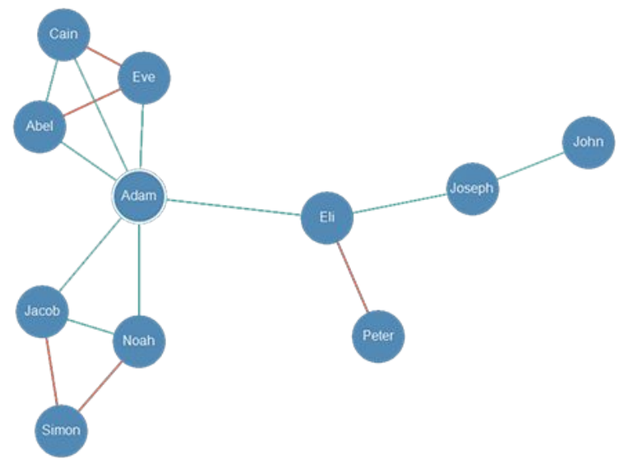

Fig 2 - Trust topology example - VRS.

Conclusion

Despite undergoing numerous modifications throughout the project, we successfully developed a proof-of-concept that aligns with the initial essential requirements. However, it is crucial to note that the system necessitates additional deliberation and is not currently ready for release as a marketable product. Nonetheless, the proof-of-concept offers valuable insights into the potential and benefits of incorporating compact and secure distributed systems within communal environments.

References

[1] "Reputation System Documentation (2023) | EMPRESTA.ME," Available at: https://empresta-me.netlify.app/docs/1.0/ReputationSystem

EMPRESTA.ME
Organisation@Github

universidade de aveiro
theoria poiesis praxis

deti departamento de electrónica, telecomunicações e informática