

CloakedCommerceDB

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ABSTRACT

This document details a project called CloakedCommerceDB, a database-driven website designed to organize anonymous exchanges between two pairs of users. This project is part of the curriculum for the CS360 class at the University of Idaho.

A key focus for this project will be maintaining anonymity for all users of the system, which will be implemented with hashing. The final result of this paper will be a fully functional website using MySQL to trade between other users.

CCS CONCEPTS

• **Information systems** → Service discovery and interfaces; RESTful web services; Query representation; *Query intent*; **Query reformulation**; **Query languages for non-relational engines**; Semi-structured data; **Middleware for databases**; **Database query processing**; **Query languages**; • **Human-centered computing** → *Human computer interaction (HCI)*.

KEYWORDS

Schema Graph, Biological Databases, Data Integration, Ad hoc Querying, Schema Abstraction, Query Reformulation.

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1 INTRODUCTION

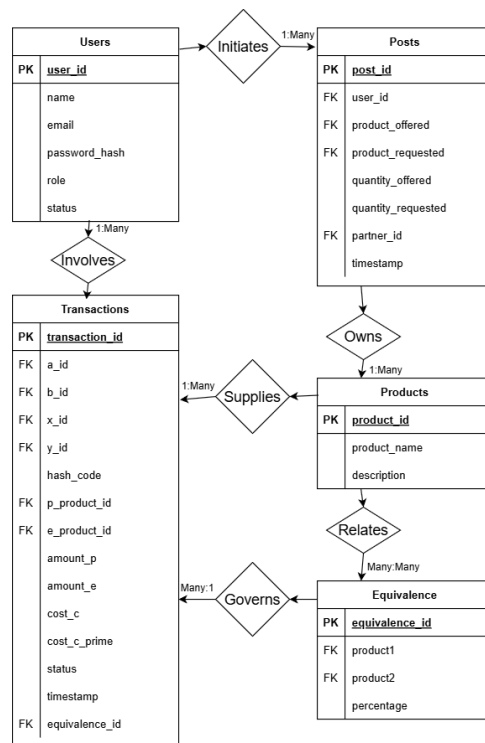
CloakedCommerceDB is an anonymous bartering platform designed to facilitate the exchange of goods and services without revealing users' identities. In our current time, we face a new issue: the issue of privacy and security. Many websites that offer bartering platforms do not have safeguards for protecting their users' identities. CloakedCommerceDB addresses this issue by utilizing a 16-digit hash key authentication system to ensure complete anonymity during these transactions. Unlike other marketplaces, this system allows users to post, browse, and trade items while safeguarding their personal information.

The platform will be accessible in any web browser through our carefully constructed website, designed with React.js and Bootstrap

to provide a consistent user experience across all devices. Our back end is powered by Node.js with Express, enabling us to create a secure and efficient data processing system. This, paired with our encrypted MySQL databases, provides a reliable and secure platform.

Overall, CloakedCommerceDB will provide a secure platform for trading that redefines the standards followed by similar platforms.

2 E.R DIAGRAM



Our ER diagram outlines the logical structure of the CloakedCommerceDB system, illustrating how data is managed and communicated for anonymous bartering. It includes five key entities: Users, Transactions, Products, Posts, and Equivalence. The Users entity contains primary key user_id, username, and role, defining each user's role in the barter process such as a trader or admin. The Transactions entity captures details of each exchange with foreign keys a_id, b_id, x_id, and y_id referencing Users, p_product_id and e_product_id linking to Products, plus attributes hash_code, amount_p, amount_e, cost_c_prime, cost_c_double_prime, and equivalence_id.

The Products entity includes primary key product_id, product_name, and description, representing items available for barter, with transfer costs cost_c_prime and cost_c_double_prime tracked in Transactions. The Posts entity with primary key post_id links to

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Users via `user_id` and `partner_id`, and to Products via `product_offered` and `product_requested`, capturing barter offers and requests. The Equivalence entity with primary key `equivalence_id`, `product1` and `product2` as foreign keys to Products, and `percentage` forms the equivalence ratio for product value comparisons. Relationship sets include Users-Transactions as one-to-many since one user can have many transactions, Products-Transactions as one-to-many because one product can be in many transactions, Users-Posts as one-to-many where one user can create many posts, Products-Posts as one-to-many since one product can appear in many posts, and Equivalence-Products as many-to-many because multiple products can have various equivalences.

3 TOOLS

Our main development tool for both the front-end and back-end will be JavaScript. JavaScript will be the front end with React.js to help with the user interface. To help with the back end of the website, we will be using Node.js which will allow us to use JavaScript for connecting to the database aspect. Currently, there are plans to integrate payment with PayPal and Cryptocurrency. CloakedCommerceDB will be using MySQL for the database management system in order to securely store and manage data from users.

For working on the project we will be using Visual Studio Code. VSCode has built-in integration for Git/Github as well as numerous other extensions to ease the programming process, which makes it a fantastic choice for this project. VSCode also includes automatic formatting support for HTML, PHP, MySQL, and JavaScript which significantly impacts the time it takes to implement.

For version control, we will be using Git and GitHub so both partners can work on the CloakedCommerceDB in a standardized environment.

4 PLAN / TIMELINE

Development of CloakedCommerceDB will be done in phases with updated documentation and presentations to demonstrate progress made in implementation and understanding. This project will continue through the course of the University of Idaho Spring 2025 semester and will end on May 1st with a completed project.

4.1 Phase I - February 25th

By February 25, we will have completed two pages of documentation which will include an ER diagram with an explanation of database design. The paper will also include an implementation methodology with details of the tools that will be used for individual parts of the development.

4.2 Phase II - March 21st

By March 21, we will have a working prototype for the CloakedCommerceDB website, with the front-end mostly implemented to demonstrate the implemented functionality. This will also include very basic MySQL implementation to show understanding of database design and querying. The report for the CloakedCommerceDB will be four pages long with more details of implementation.

4.3 Phase III - April 18th

By April 18th, a fully functioning prototype will be available with all intended functional features. The prototype will include all the trading interfaces and feature a fully implemented front end. The phase III report will be six pages long further detailing the CloakedCommerceDB implementation.

4.4 Phase IV - May 1st

By May 1st, the fully working final product will be released and the final touches for the product will be implemented. The system should be fully functional with no large errors or bugs for all systems, including administrator tools, account creation, and database queries. There will be an eight-page document specifying implementation of our trading system with encountered challenges being detailed.

5 CHALLENGES

5.1 Anticipated Challenges

While Developing the CloakedCommerceDB system we anticipate several challenges, primarily in ensuring anonymity, cross-platform compatibility, data security and accurate cost simulations. To maintain anonymity we will use a 16-digit hash key for authentication anonymously, this will ensure user identities are protected during (simulated) transactions. For Cross-Platform compatibility to work properly we will use React.js paired with Bootstrap in order to keep a consistent user interface and experience across any device.

Ensuring data security while maintaining integrity for these transactions is another challenge, we will be using MySQL with encryption methods in order to securely manage user information. Finally accurately simulating barter exchanges and cost adjustments will require using an equivalence table (T) for value comparisons and the Node.js backed logic in order to perform constant real-time calculations to simulate real prices changing for bartering. Overall these solutions will help maintain anonymity, security, and fair value simulations.

5.2 Encountered Challenges

As of this time we have not encountered any major challenges that have stalled us.

6 CONCLUSION

Overall, CloakedCommerceDB is a system designed to match users looking to exchange products and services while maintaining their own anonymity. CloakedCommerceDB will be accessible through a user-friendly website which provides a seamless and efficient platform to make transactions between individuals who wish to exchange goods.

The users of the system can easily view their postings or transactions by logging into their verified accounts. From within their account, they can view and manage posts they have made, track any ongoing transactions, and review their account history. Admins can log into the website and view and manage current postings on the website. Admins are also responsible for approving new account-creation requests in order to ensure only real people can create accounts.

Overall, CloakedCommerceDB will offer a secure and anonymous platform for users to exchange goods efficiently and privately. With this focus on user's anonymity, security, and ease of use. It

has the potential to change the way bartering is done by providing a trusted and straightforward process.

REFERENCES