



University of
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A Blockchain Explorer for Bazo

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Abstract

Das ist die Kurzfassung...

Acknowledgments

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Chapter 1

Introduction

1.1 Motivation

The bazo blockchain application consists of two command-line tools called `bazo_miner` and `bazo_client`. Both tools are needed to run and interact with the blockchain. Every `bazo_miner` stores all the blockchain and state data in its built-in storage component, however there is no way for a user to browse through that data using a GUI. Information about the health and productivity of the system are not available either. This is why a blockchain explorer is needed, a separate service that lets users examine the blockchain data, without directly taking part in the network.

1.2 Description of Work

This thesis documents the design and implementation of a blockchain explorer for the private blockchain bazo and its corresponding cryptocurrency bazocoin. The explorer allows users and admins of Bazo to inspect and analyze data regarding the bazo blockchain. Blocks, transactions and accounts are being displayed in an informative and well-structured manner, with the explorer acting as a visualizer for the blockchain. Statistical information about the blockchain will also be made available to the user. Furthermore the explorer features admin-only functionality, serving as a GUI for setting various system parameters from the web via a gateway to the Bazo network.

1.3 Thesis Outline

Chapter 2 introduces the bazo blockchain and analyzes existing blockchain explorers and statistics analysis platforms. Chapter 3 focuses on the design of the bazo explorer, consisting of both, the frontend and its corresponding backend. Chapter 4 documents the implementation of the web application, followed by an evaluation in chapter 5. A summary and conclusions are presented in chapter 6.

Chapter 2

Related Work

This chapter gives an overview of the bazo cryptocurrency and its underlying blockchain technology. Additionally it presents an analysis of blockchain explorers for 2 different cryptocurrencies, highlighting both similarities and differences in the implementation and functionality of the applications. The analysis plays a major role in the specification of the Bazo Blockchain Explorer, as it helps making design decisions for requirements.

2.1 The Bazo Blockchain and Cryptocurrency

Developed in 2017 by Livio Sgier, the Bazo cryptocurrency is a private blockchain that aims to reduce administrative overhead, as well as extend the functionality of a financial service provider's bonus point reward system. Traditionally, for each merchant who wants to sell its products in the rewards shop of the service provider, specific contracts between the two parties need to be made. This makes expanding the bonus point system a time and resource consuming process. Bazo eliminates this restriction by introducing a cryptocurrency which allows to directly make transactions between merchants and users or even between users itself using Bazocoin. The merchants itself do not need to form contracts with the service provider anymore, they can offer their products in exchange for Bazocoin even at their own PoS. The only interaction between the service provider and merchants consist of the exchange of Bazo coins for fiat currency. Users of the bonus point system can exchange the current bonus points for Bazo coins. In order to access the blockchain, client and miner applications are available. MORE INFO ABOUT THE CLIENT, LIGHT CLIENT, MINER, WALLET, PAYMENT APP.

2.2 Existing Blockchain Explorers and Analytics Platforms

2.2.1 Blockexplorer.com

This blockchain explorer was built for both the bitcoin and bitcoin cash blockchain. The frontend of the web application is called Insight UI and is built using AngularJS, a javascript framework. It interacts with the Insight API, the corresponding backend. Insight API consists of a REST and websocket API for Bitcore Node, a query and indexing service for the bitcoin blockchain. The source code for both frontend and backend are available on GitHub.

2.2.2 Etherscan.io

EtherScan is a block explorer and statistics analysis platform for the ethereum blockchain. It uses Go Ethereum, an implementation of the Ethereum protocol in the Go language, in combination with Parity, a client for interacting with the Ethereum blockchain. EtherScan is a closed source project.

2.3 Analysis

This analysis omits features of the explorers that do not relate to the blockchain itself, such as newsfeeds of blockchain-related topics or social media links. Both explorers offer similar functionality as their core-feature: Structured views of blocks and transactions. The landing pages display the most recently mined blocks and transactions, with blockexplorer offering real-time updates. EtherScan also displays statistical data about the chain, such as the market cap, mining difficulty and hash rate. A search feature is present on both sites, offering the user to search for transactions, blocks and accounts via their respective hashes. To browse the chain, links are used extensively (e.g. every block on the landing page links to its respective block page). When presenting multiple objects on the same page, such as a list of blocks, the data is structured using tables, in EtherScan's case using pages with a predefined length and in blockexplorer's case using a date picker that displays all blocks which have been mined on the chosen date. When multiple items are displayed using lists, less information about the items is given, compared to when a single item is viewed.

Chapter 3

Design

This chapter covers the design of the blockchain explorer and the components necessary to run the application.

3.1 Structure of the Service

The program that users and admins use to view blockchain data is a website, which is made up of a front- and a backend. However, to run the blockchain explorer on its own, additional components beside the front- and backend programs are required. The website fetches blockchain data from an SQL database that runs independently from the blockchain. A separate database was chosen, because additional data like statistical information needs to be calculated and stored as well, which would bloat all miner's built-in databases with information, if implemented in the miner. The fact that there are unified data structures and the possibility of having stored procedures in the database makes SQL a preferable database model, since the website always queries predefined statements. This also makes running the website possible without having a miner running in the backend. However this requires a program that copies data from a running Bazo mining node's database and stores it in the new database. As mentioned above, the backend accesses this database by making queries for relevant data and sending the results to the frontend to be displayed to the user. GRAPHIC OF SYSTEM

3.2 Structure of the Website

To make sure that a user has access to all features of the website at all times, a navbar that features links to all functions and a search bar are present on every page of the application.

Chapter 4

Implementation

Chapter 5

Evaluation

Chapter 6

Summary and Conclusions

Bibliography

[1] Autoren: Titel, Verlag, `http://...`, Datum.

Abbreviations

AAA Authentication, Authorization, and Accounting

Glossary

Authentication

Authorization Authorization is the decision whether an entity is allowed to perform a particular action or not, e.g. whether a user is allowed to attach to a network or not.

Accounting

List of Figures

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Appendix A

Installation Guidelines

Appendix B

Contents of the CD