Smart Profile Application Authenticated by Blockchain

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Abstract

The purpose of this study is to gain knowledge of the use of Blockchain in the Human Resource Management of organizations and build a smart application system using the same. This system tackles the problems that usually arises while working in a traditional recruitment s namely: preventing fraudulent applications by verifications, automated payments. The immutability and verifiability of blockchain enables the users to create digital passports that can be relied upon as proof of individual's professional trustworthiness, identity and qualifications. Until the users provide with full consent to access their profile (block), it won't be accessible. The smart profiles in the FLO blockchain prevent resume fraud, selection bias and provide 100% transparency in the profiles.

Introduction

The Blockchain is a ledger technology that is governed by a consensus mechanism. It can be considered a record of events maintained digitally but it can also contain smart contracts, which are programs stored on the blockchain that run as implemented without any risk of downtime, censorship, or fraud (Buterin 2014). Especially the labour market, wherein talent management and search and recruitment of new talents takes place. The Disruption in HR by Blockchain has been very recent and the use cases in this sector, just like all the other ones, are enormous. The literature review contains a detailed understanding of Blockchain's current application in Human resources, and historical in chronological order. Building smart profiles using Blockchain will not only prevent organizations from being victimised by resume fraud but also provide job seekers with the opportunity to provide their profiles with complete transparency and continue to maintain the protection of their information. This can thus be relied upon as proof of an individual's professional trustworthiness. Verifiability of the information is also a bonus of this process. Additionally, Smart Contract will be enabled to transfer tokens to the selected applicants as an added incentive. The wait time of information verification will be drastically reduced and also remove the subjectivity factor out of the profiles.

Introduction to Ranchi Mall

Website: https://ranchimall.net/

Ranchi Mall is a self-funded enterprise. It's been incorporated as a Blockchain Contract.[1] The first commercial product from Ranchi Mall was Bitcoin Bonds. They were launched in February 2017. Bitcoin Bonds were developed in 7 years. Bitcoin Bonds were so profitable that we were able to use 70 percent of the profits gained from their sale toward the initial asset value for their Initial Coin Offering. White Paper for which was released in September 2017[2]. Everything in detail is available about this internet company on their Twitter, Facebook and Medium Channels.[3]

All the work contributed by the Interns under Ranchi Mall is covered in their Internship Blockchain Contract.

Some of the other projects by Ranchi Mall include:

- Ranchi Mall Startup Contract
- Ranchi Mall REAL ESTATE Blockchain Contract
- P2P Content Collaboration
- Web Wallet

[1] https://medium.com/ranchimall/fixing-smart-contracts-here-comes-blockchain-contracts-ca0243ef506f

[2] https://www.ranchimall.net/ICO/

[3] https://medium.com/ranchimall/all-you-wanted-to-know-about-ranchi-mall-but-were-afraid-to-ask-c50467e6b830

Literature Review

Bitcoin - built-in 2009 as a peer-to-peer electronic cash system was the first use of BlockChain application and it used proof-of-work to record a public history of transactions that quickly become computationally impractical for an attacker to change if honest nodes control a majority of CPU power. By 2016, Blockchain technology was seen as a tool with the capacity to revolutionize our digital world, by opening the door for developing a democratic open and scalable digital economy from a centralized one. It was seen that this disruptive technology has potential not only in financial applications like cryptocurrencies and insurances but also to help in building decentralised applications for proof of the existence of documents and storage. Blockchain created an opportunity to create a market design that questions privacy. It was predicted that Distributed ledgers that track ownership will become very valuable when the standards and infrastructures become even more matured and developed.

No single party controls the blockchain. Complete audit trails of each informational transaction can be traced. HR has started to play a bigger and more strategic role with issues encompassing HR policies, practices and the value of addressing and managing human resources in multinational enterprises and it is no longer limited to payroll and recruitment (Schuler and Jackson, 2005; Wright and McMahan, 2011).

With the growing use of Blockchain in all sectors, its introduction in HR can be seen as a disruption consisting of three big waves:

The first wave will deal with candidate verification and real-time payments. The Second wave involves building better talent markets and creating more trust. Lastly, the third wave will focus on seamless work sourcing and autonomous organisations. (Spence 2018). Recent research has indicated that blockchain intention to use can be affected by social influence (Ferri et al., 2020). Potential blockchain benefits include trust, cost reduction, automation, processing speed, streamlined process and disintermediation (Hughes et al., 2019; Schmitz and Leoni, 2019). With a platform like a blockchain, no cost would be incurred for establishing trust, thus facilitating risky transactions and sharing sensitive information. The biggest advantage associated with blockchain is the cost and time savings (Cocco et al., 2017). With its integrated structure, blockchain can offer services at reduced transaction costs in real-time (Hughes et al., 2019). Third-party record repositories can be vulnerable to corruption by failure in storage systems or human mischief, which could be mitigated by unbiased and incorruptible blockchain-

based digital systems (Nærland et al. 2017). With its computational algorithms, it can conduct transactions in real-time in a verified manner without requiring a third-party intermediary, thus saving costs and time (Gatteschi et al., 2018).

Methodology

Blockchain-Based Recruitment Management System: This system collectively ensures all the recruitment related processes and tasks can be worked upon by one single platform. All the available Job opportunities are listed on the job portal and interested candidates can apply on a single click. To ensure that the opportunities are fairly provided and candidates applying to these positions are real, their background and identifications are validated using their letters, certificates and previous employers. Only after they have been confirmed to be all clear, they are added to the Job-Portal Database from which, they are sent to the respective companies/ opportunities.

The Smart Profile Application is built using the FLO blockchain which introduces the feature of FLO data. It is a read and write data field using which any individual can write instructions using Natural Language and it follows open index protocols. Front-end is built using HTML and CSS. Back-end for smart contract is built on Python to ensure natural-language user simplicity is maintained. The standard operations and blockchain development have been performed using JavaScript. While building the FLO Blockchain based network, list of Standard Operations[4] has to be abided by. These include:

- **compactIDB:** Compact Indexed Databases - To add, delete, read, write and remove content from databases.
- **floBlockchainAPI:** FLO Blockchain Operator to send/receive data from blockchain using API calls
- **floCloudAPI:** FLO Cloud operations to send/request application data
- **floCrypto:** To encrypt, decrypt data and validate/verify keys
- **floDapps:** General functions for FLO apps like managing sub-admins, secure keys and custom inputs
- **floGlobals:** Constants for FLO blockchain operations for example, adminID,

[4] media/marketing-posters/FloStandardOperations at master · ranchimall/media · GitHub

apiURL, SNStorageID

- **floSupernode:** flo Supernode Operators to send/receive data from supernodes using websocket

The primary idea of the application is to build a blockchain-based system wherein the applicant's details, employment history is saved as a transaction on the blockchain. It will save up all the time wasted in verifications of data, and validation of this data. HR offices need not be contacted for any additional information as all the information is already available on their specific block.

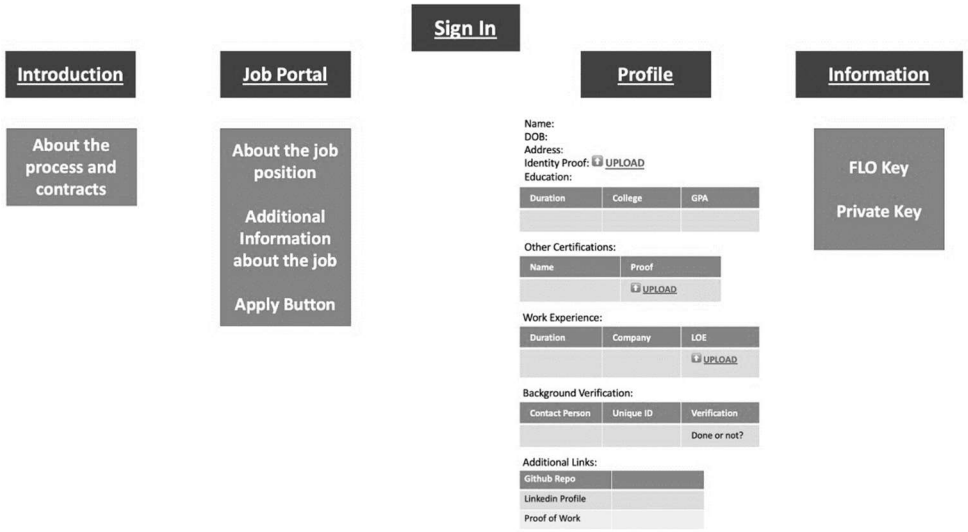

Fig: User-end Structure for Recruitment Management System

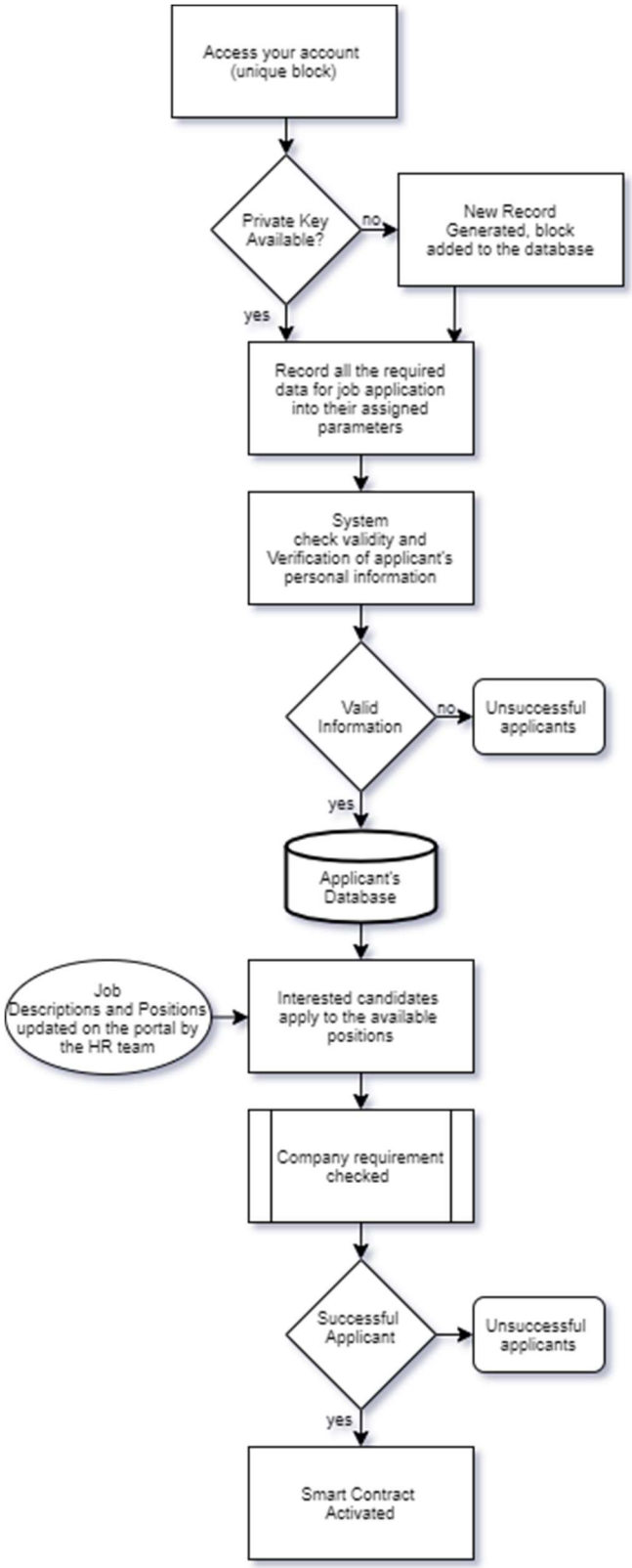

Fig: Blockchain-Based Recruitment Management System

Smart Profile application consists of the below important parts:

User Profile and Website

Every applicant will have a unique Public and Private key which will be used to access their profile. For project purposes, working with FLO testnet API is used. Once the applicant logs in to their profile page, they have 5 options to select from Intro, Projects/ Job Portal, Profile, Messenger and Web-Wallet. They can also access their Information on this page.

- **Intro:** Intro will provide you with the information about the website, and what is accessible. Since blockchain is a transparent network, contract conditions of each item are easily readable and no hidden or white lies can exist. The process to apply and evaluate are also pre-specified for the same.

- **Projects:** Enlists all the projects available that you can apply for. It also provides details like minimum time commitment, their unique payment structures if any. Option to directly apply for this position using the Apply button.

- **Profile:** All the Details of an applicant need to be filled in very carefully. Information such as Name, DOB, Address, Education, Work Experience, Background Verification, Additional Links. Files providing proof for these details need to be uploaded as well. **Two Major drawbacks of Job Application platforms:** Background and Certification Verification are resolved using this blockchain-based evaluation application. Certificate Verification will be done via a standalone JavaScript, HTML file which will ensure that all the information entered is accurate. For Background Verification, Applicants can provide the details to contact the HR of their previous employers, since calling, or sending email for every application is a cumbersome process. Applicant fills the Contact Person's Name, Unique Public Id and Verification Request is sent to those verifiers directly.

- **Information:** FLO ID and Private Key are saved here for quick review by the applicants.

- **Messenger:** All the messages and emails are recorded in the messenger app. HR and Company talent teams can contact the applicants directly for any doubts

and clarifications. Messenger can be accessed using the private key and all the data is encrypted end-to-end.

- **Web Wallet**: Web Wallets remove the consistent issue of creating local wallets. As long as one has access to the internet, they can open these wallets to track their tokens, transactions which are updated on the cloud.

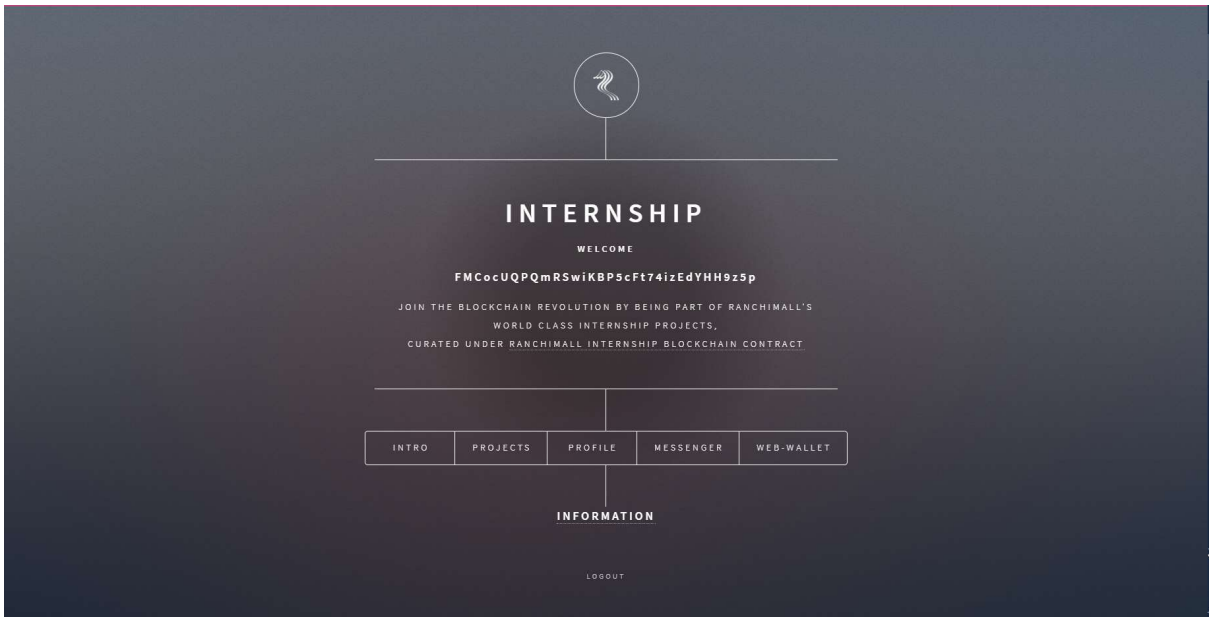

Fig: Home-Page of Application

Web Wallet

These are client-side scripts that can generate FLO addresses, send FLO transactions to the blockchain and monitor FLO data from the blockchain[5]. Three major operations performed by the web wallet are managed using this web-app. Recover or Generate FLO Address, Send FLO Data, and Monitor FLO Data. Each Applicant can access their web wallet using their unique ID. Every Applicant can also check and track their FLO available with them, through the same.

Monitor FLO Data

a. Click/Tap on the '+' floating button on the bottom right evaluate-hand hand side, which opens a popup window.

b. Enter the FLO address that you want to monitor, you can also specify a label to that address which will be displayed as the name for that address. If you left the label field empty, the default label will be 'Unknown'.

c. Click/Tap on 'Ok' and the address you added will be displayed on the monitoring page as a card. This address is also added to your local database. Once you add an address/label pair, It will stay there until you clear data (Option available in Settings page).

d. When you hover the mouse pointer on a monitoring card, three dots will appear. clicking on this allows the user to edit or remove that address from the monitoring list. (On mobile devices this option is always visible)

e. To see transactions done by any address, click/Tap on the respective address card. It will open a follow-up window, which displays transactions in the message format. consisting of data sent/received to/from, date of transaction and FLO data. Arrows on the message body indicate the direction of the transaction i.e. Data is sent or received. At the top of the window, we have the option to go back to the monitoring page or refresh the transaction history.

[5] https://ranchimall.github.io/flo-webwallet/testnet.html

Smart Contracts

Blockchain Contracts are smart contracts with Human intervention at the most critical points. It prevents the system from being Turing complete. Inserting the Human Judgement or decision at critical points helps the contract get the full benefit of machine speeds and still makes the system free from human bias.

Once data has been entered into the blockchain it stays there forever. The Data Interpretation system available at Ranchi Mall enables users to perform user-friendly token creation and transfer systems.[6] floData Feature of 1040 characters is applicable here as well and can be used to create a new system of instructions. [7]

This system is used in the web wallet as well. Rules applicable for this execution include:

Token Creation

- FLO Address can be used to create a new token system by ending the word with "#".
- The Count of the number of tokens has to be specified as either in decimal numbers or numbers followed by thousand/ million/billion/trillion.
- To Invoke token creation system keywords are start/ begin/ incorporate/ create
- Any confusing instruction is rejected.
- Words can be in any order.
- The token supply amount will be credited to the sender's FLO address.

Token Transfer

- To invoke token transfer system keywords are: give, send, transfer.
- The name of the token has to be specified.
- Token Amount has to be specified.
- Sender Address must have more tokens balance than the amount being transferred.

[6] https://medium.com/ranchimall/introducing-natural-language-based-token-creation-transfer-system-on-flo-blockchain-e4bc944b2c28
[7] https://flodata-tester.duckdns.org/

Applicant Selected- Smart Contract

If a particular applicant clears all rounds of verifications and satisfies the requirements for a particular position, they are transferred tokens in advance, this is a bonus amount and guarantees the selection of the candidate.

To create a transfer, 3 Steps are followed:

Token Creation

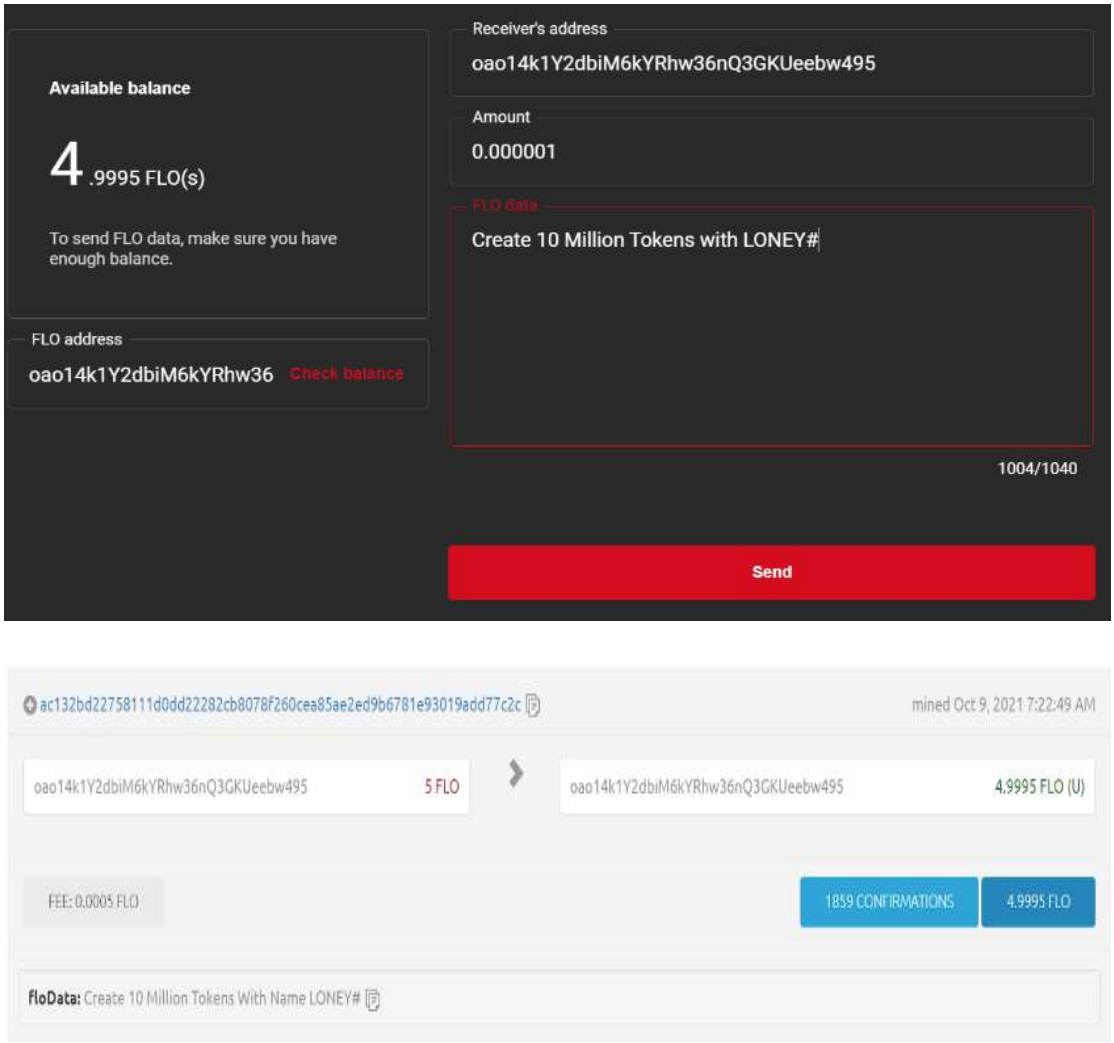

Fig: Testnet Flosight Validation- Token Creation

Smart Contract Creation

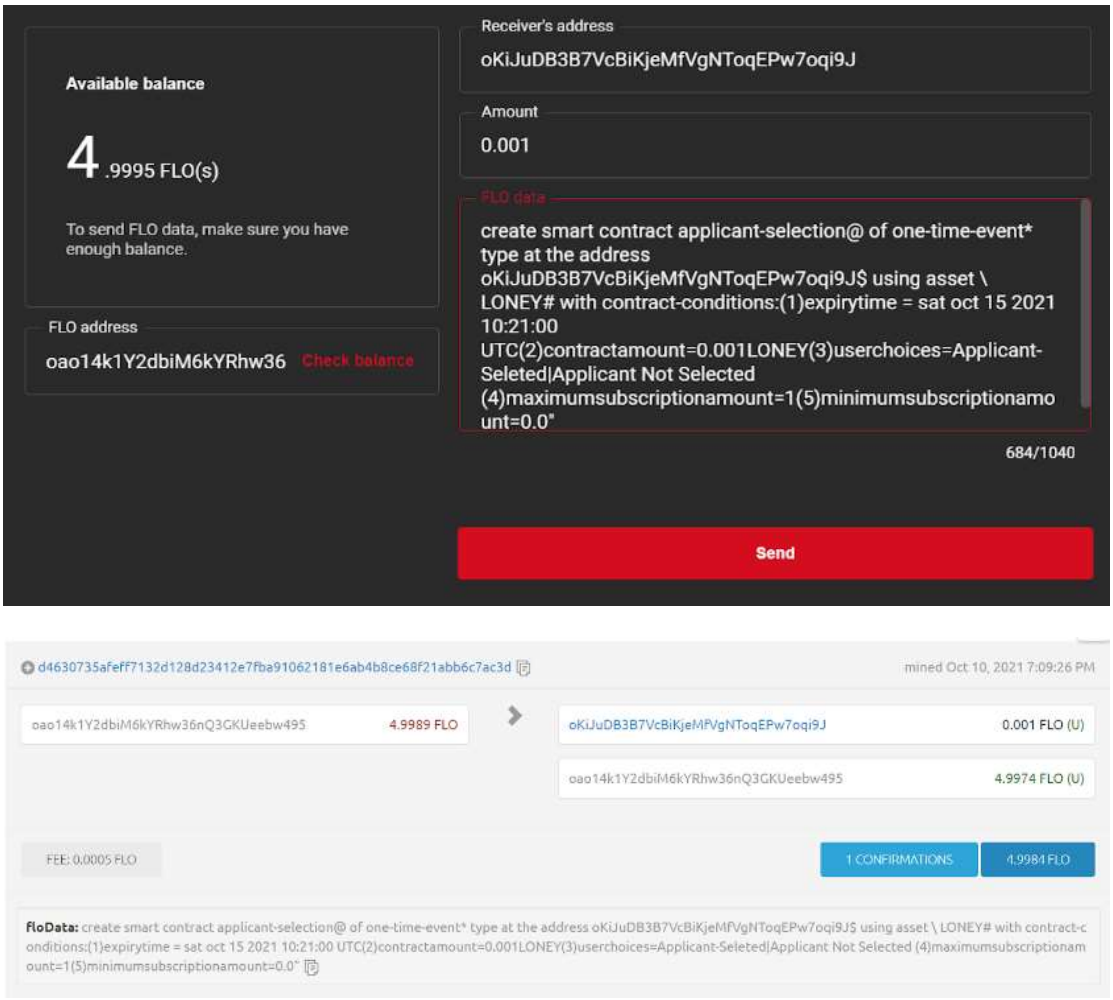

Fig: Testnet Flosight Validation- Smart Contract Creation

Smart Contract Transfer

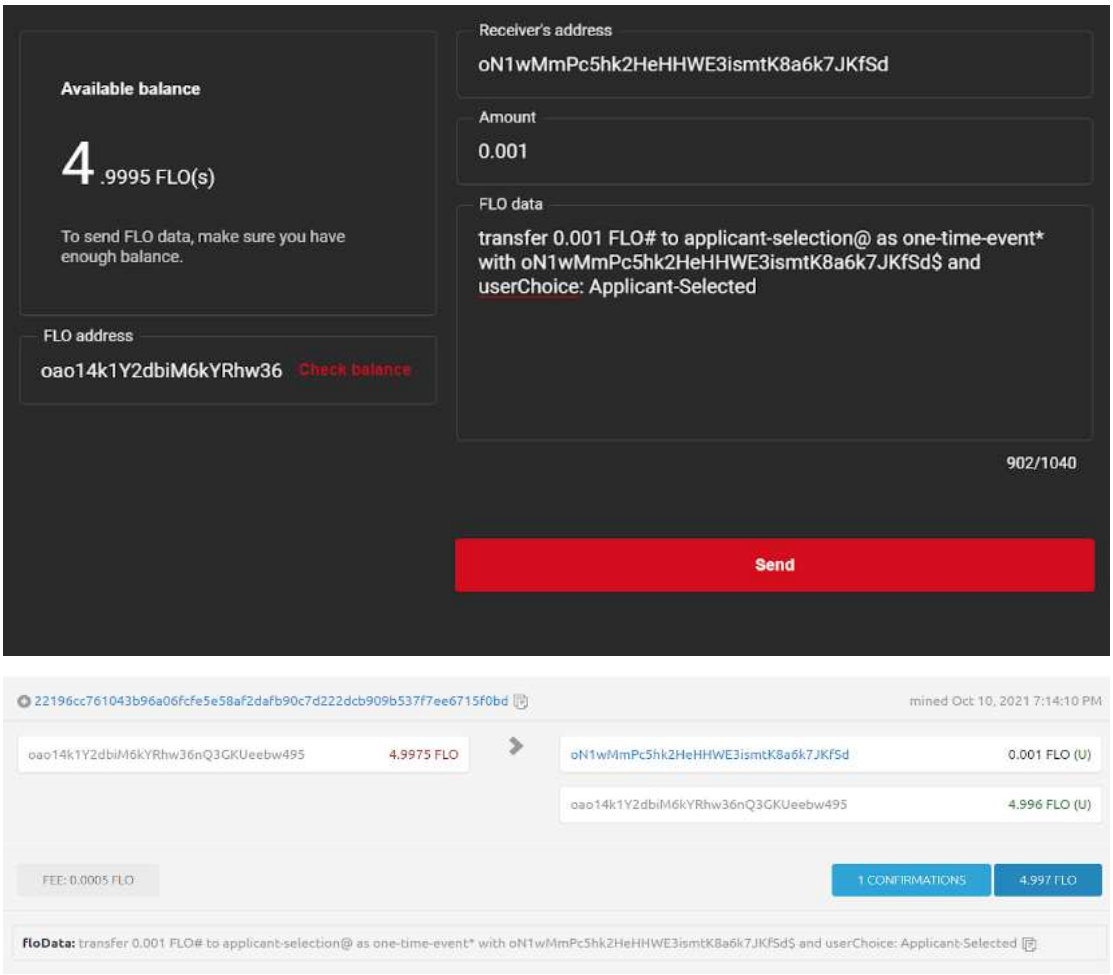

Fig: Testnet Flosight Validation- Smart Contract Transfer

Analysis and Findings

Records of all the applicant's are maintained using Block chain	Each Applicant's records are stored in blocks using their public keys
HR and Talent Acquisitions can submit their queries via APIs to access applicant's encrypted data	Applicants permit Job portals to access their job records by sharing their unique IDs

This Application will deal with the early-use case scenarios of Blockchain in HR, namely being:

- **Background Check:** Certificate verifications and ex-employers can verify your credibility and this way eliminate the chances of fraudulent applicants.
- **Data Security:** Records made on Blockchain are encrypted and even though millions of records will be existing at the same time, they cannot be accessed unless given permission in tokenized forms. API calls can be used to extract this data then.
- **Time Value:** A lot of time is used in the talent acquisition and onboarding of new employees especially with regards to authenticity and response times in verifications. The application will ensure the windows for errors especially on the HR's side when hiring new candidates is minimized.
- **Smart Contract and Benefits for employees:** Automatic Payments and added incentives can be provided to the workers. It ensures a smooth income and cash flow for workers as well.

Any Data Transfer, Transaction or information shared on the blockchain can be verified. For FLO Blockchain, these Transactions can be verified at flosight[8] (testnet or mainnet) depending on the network used. They can be uniquely identified by their address, block or transaction id. Transactions can be viewed on testnet Flosight[9].

[8] https://livenet.flocha.in/
[9] Flo Address oao14k1... | Flosight (testnet-flosight.duckdns.org)

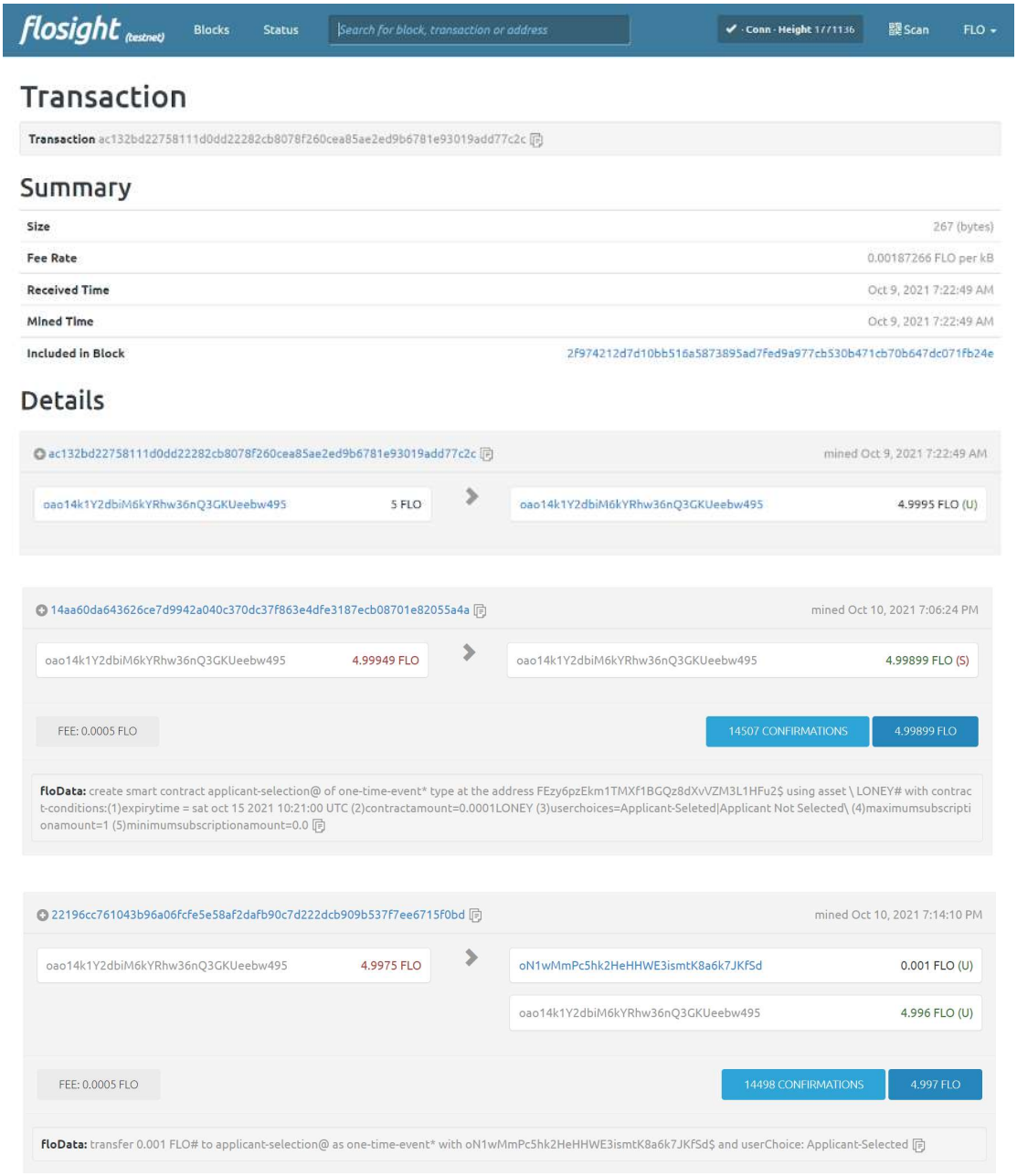

Fig: Transaction Summary

Conclusion And Future Scope

The application will work like a one-stop value passport that would help the employers

access individual applicant's data especially about their skills, expertise and help them become gain greater value in the employment market. Fraud prevention and data protection are almost out of sight thanks to Blockchain's Consensus. These factors play a big role in improving the HR space with disruption through blockchain. To improve this model, human interference specially in verifications should be reduced as it will decrease the human biasness and provide better opportunities for job opportunities. Automated HR Chatbot to ensure background verifications from previous employers can be setup in this network.

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[9] Cleary, Walter and Jackson, 2013, p. 2363)

[10] https://medium.com/ranchimall

[11] https://github.com/ranchimall