IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 7.39 ⵋ Vol. 11, Issue 5, May 2022

DOI: 10.17148/IJARCCE.2022.11558

Blockchain based “Transparent and Genuine Charity Application”

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Abstract: Charity plays an essential role in our society, and often recognized as a type of social debt, leading to the circulation of a significant amount of money worldwide. We have witnessed increased growth of non-commercial organizations and charity funds through recent years, collecting donations for various philanthropic needs. Unfortunately, charity funds frequently gain much traction from the unscrupulous organization, leading to significant damage for industry's reputation, reducing trust level, affecting the power to boost donations. We strongly believe that utilizing blockchain technology will boost trust, increase efficiency, and encourage more donations. The Charity Webapp project, a blockchain-based charity foundation platform that facilitates the trustful network's formation and is accountable for collecting donation funds. The blockchain network would be comprised of publicly known, trustful, and prestigious organizations. All organizations' operations within the platform will become fully transparent and visual , leveraging properties of immutability, provenance, and non-repudiation. Therefore the platform will alleviate the results of dishonest actions, revealing fraudulent organizations' activities.

KEYWORDS: Blockchain; ensuring trust; NGOs; encryption, Bitcoin, Beneficiary, Donars.

I. INTRODUCTION

“Blockchain is a tech. Bitcoin is merely the first mainstream manifestation of its potential.”

- Blockchain is a digitized, distributed ledger for all records.
- A distributed database recording transaction in chronological order.
- Devised initially to power bitcoin.
- Blockchain is built with 3 core technologies:

01. Private Key Cryptography

- ECC
- RSA

Example – Bitcoin and Etherum are working on ECC algorithm which is a part of EDCA Umbrella ECC algorithm states a curve where mirror points are choosen as a key pair.

0.2. P2P Network

- Torrent Networks
- System of Records

Example – A P2P system is devised in such a way that the network participants do not need to trust a centralised server they are connected and creates trust through the consensus.

0.3. Program (The Blockchain Protocol)

- Hashing Algorithms
- Handshake Algorithms

Protocols are used to define how our chain will operate.

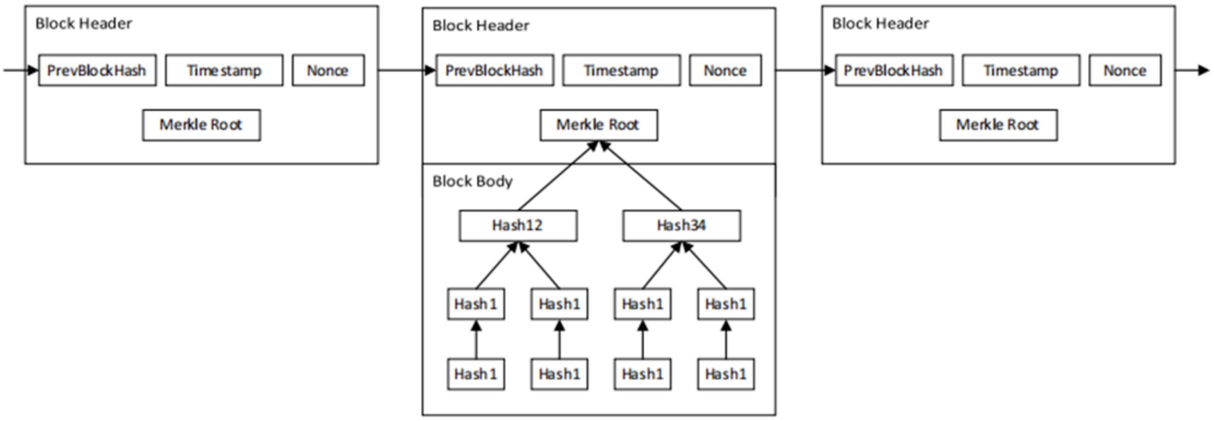
Example – The bitcoin defines that an new block will be added about every 10 minutes. A reward will be distributed for conformation of the blocks, and the blocks size could not go up to 1mb. Other blockchain have some different protocols some blockchains might also include protocols for assets in data.

Blockchain in general is a digital store of information which is distributed and available over P2P network. Blockchain is based upon cryptographic algorithms and runs consensus algorithm for security and immutability. Every new block is added inside the blockchain which is linked to the previous block using the block hash. [22]All the blocks are present in chronological order and every participant over the network can view all the transactions.

- It’s a digitized store of information in the form of transactions.
- It is distributed. Thus, nobody control’s it.

- Security and immutability is validated with the help of consensus algorithm.
- When a new block gets added to over a blockchain, it is connected to the previous block using a cryptographic hash.
- Data gets stored in chronological order.
- Everyone present over the network can view the transactions.

Blockchain Definition:
“A blockchain is a digitized, distributesd, consensus-based secure storage of information protected from revision and tampering over the P2P network.”



A blockchain network witnesses an excellent deal of transaction activity. When utilized in cryptocurrency, maintaining a record of those transactions helps the system track what proportion was or wasn't used and which parties were involved. The transactions made during a given period are recorded into a file called a block, which is that the idea of the blockchain network.
A block stores information. There are many pieces of data included within a block, but it doesn't occupy an outsized amount of space for storing . Blocks generally include these elements, but it'd vary between different types:
• Magic number: variety containing specific values that identify that block as a part of a specific cryptocurrency's network.
• Blocksize: Sets the dimensions limit on the block in order that only a selected amount of data are often written in it.
• Block header: Contains information about the block.
• Transaction counter: variety that represents what percentage transactions are stored within the block.
• Transactions: an inventory of all of the transactions within a block.
• The transaction element is that the largest because it contains the foremost information. It is followed in storage size by the block header, which incorporates these sub-elements:
• Version: The cryptocurrency version being used.
• Previous block hash: Contains a hash (encrypted number) of the previous block's header.
• Hash Merkle root: Hash of transactions within the Merkle tree of the present block.
• Time: A timestamp to put the block within the blockchain.
• Bits: the problem rating of the target hash, signifying the problem in solving the nonce.
• Nonce: The encrypted number that a miner must solve to verify the block and shut it.
One 32-bit number within the header is named a nonce—the mining program uses random numbers to "guess" the nonce within the hash. When a nonce is verified, the hash is solved when the nonce, or variety but it, is guessed. Then, the network closes that block, generates a replacement one with a header, and therefore the process repeats.
Different mechanisms are wont to reach a consensus; the foremost popular for cryptocurrency is proof-of-work (PoW), with proof-of-stake (PoS) becoming more so due to the reduced energy consumption compared to PoW.
In order to increase credibility of charity organizations, we have implemented the block chain technology into this charity website .In which the Ethereum blockchain has been used.

Blockchain has different characteristics and features, the following are its main characteristics:

- Transparency
- Anonymity
- Consensus Driven
- Decentralization
- Immutability

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In this project we have implemented on Ethereum blockchain, the website interacts with the block chain
Through smart contracts for each transaction performed the transaction hash is generated which is provided as a proof for Transaction is performed safely/correctly.
Each transactions are verified by miners why own large no of Gnu's which perform computing and as a reward the miners get some of the crypto as reward

II. PROBLEM STATEMENT

Donors have every reason to fear that charitable funds will not reach people who really need them. According to the same HSE survey in 2017, 68% of citizens are willing to donate more if there is evidence of where and what they are going. By law, foundations are required to take care of public records (in particular, to publish reports on their websites), and now all reports are prepared by employees of a foundation manually .The problem of mistrust of donors and overloading of funds are often solved by organizing an external database, records during which are recorded within the blockchain. Therefore, it's important to develop a social platform supported blockchain technology which will help non-profit organizations, foundations, volunteers and social entrepreneurs in their work and make donation processes transparent and understandable for all parties. Blockchain will allow all users of the platform to ascertain their account and an outline of every payment of the organization it supports. Also, the technology of distributed ledger will guarantee a donor that the quantity will reach the goal, and with none intermediaries consistent with Rosstat research, in 2017 there have been more than 9600 charitable foundations and about 1700 charitable organizations.

III. RELATED WORK

Charity System Mode

The charity system mode proposed is shown in Figure 2. There are four roles: donors, beneficiaries, charity organizations and cooperative stores.

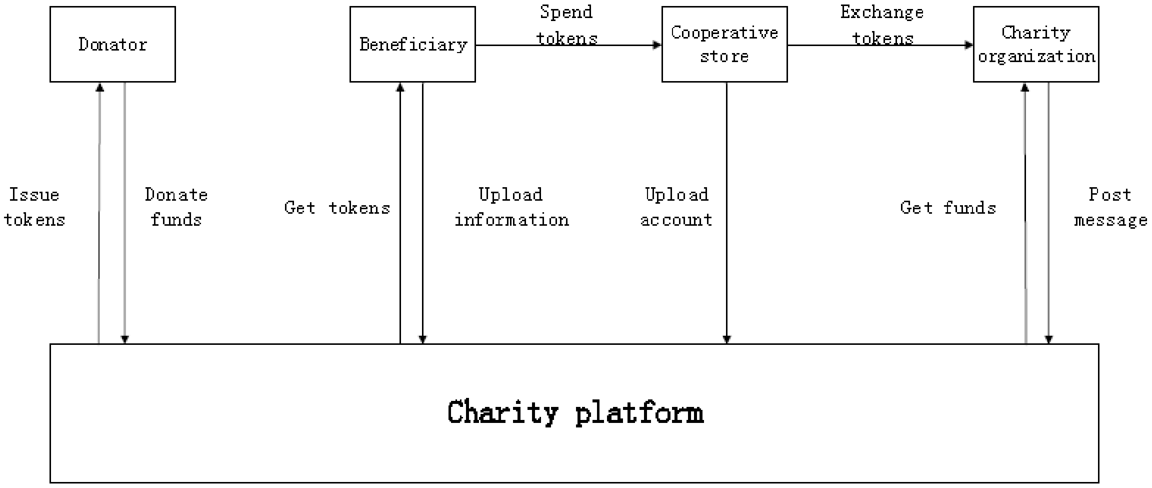

Figure 2. Proposed mode.

1. Donor

Donors are the one who donates their goods to the beneficiary (fundraisers) or to the charity administrator. After successful login on the charity platform, the donor will learn about the charity projects and select the project on which he wants to spend the token (Etherum). Then the system will check the following details and the balance of the donors account. And if the balance is insufficient in the donors account they will not be able to donate anything. Donation can be completed only if the balance is sufficient in the donors account.

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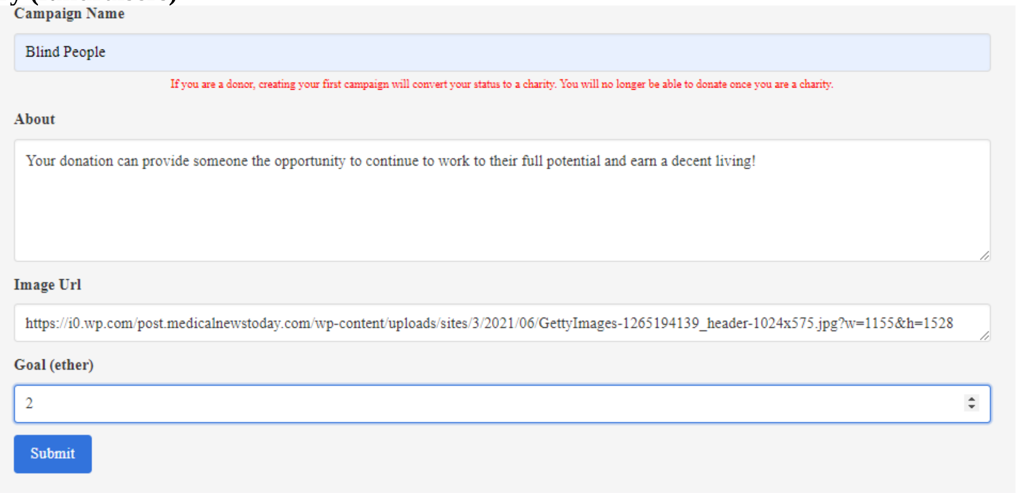
2. Beneficiary (fundraisers)



Campaign Name

Blind People

If you are a donor, creating your first campaign will convert your status to a charity. You will no longer be able to donate once you are a charity.

About

Your donation can provide someone the opportunity to continue to work to their full potential and earn a decent living!

Image Url

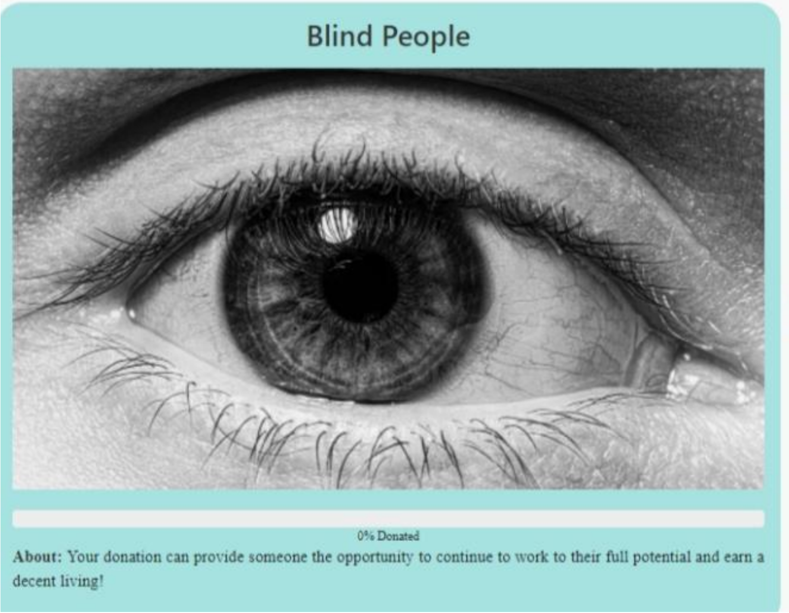
https://i0.wp.com/post.medicalnewstoday.com/wp-content/uploads/sites/3/2021/06/GettyImages-1265194139_header-1024x575.jpg?w=1155&h=1528

Goal (ether)

2

Beneficiary are the one who receive the fund from the donors but before they receive their funds they have to fill the all the required details and create their charity project and post it on the charity platform.

3. Cooperative shops



Blind People

0% Donated

About: Your donation can provide someone the opportunity to continue to work to their full potential and earn a decent living!

Cooperative shops are just like a poster or an add shown in the above image. Beneficiaries make them to obtain tokens from the donors. They can exchange tokens for real money by charity organizations.

4. Charity organization

The organization can get donation from the platform to help other people and apply money to the cooperative shops for token exchanging.

• A Decentralized System That provides security and prevents loss of Transactional Data

• The User or beneficiary can seek help and create charity projects through the platform. Donors learn about charity projects on the platform, and then donate to beneficiaries or the charity organizations. Beneficiaries upload their information to the platform for help; they can get and spend tokens in accordingly.

• Funds are transferred directly to beneficiaries .No third Party is involved.

• Low Transaction charges as no governmental charges are included and the Transactional Fees (Gas Fees) remains same for all the transactions irrespective of the amount that is transferred.

• A beneficiary initiates a charity project through a smart contract, and then the project will be deployed on the blockchain. Donors view the charity project in browser and select an appropriate project to make donation. The funds will be transferred to the Dapp administrator account. When the beneficiary needs funds, the capital expenditure request

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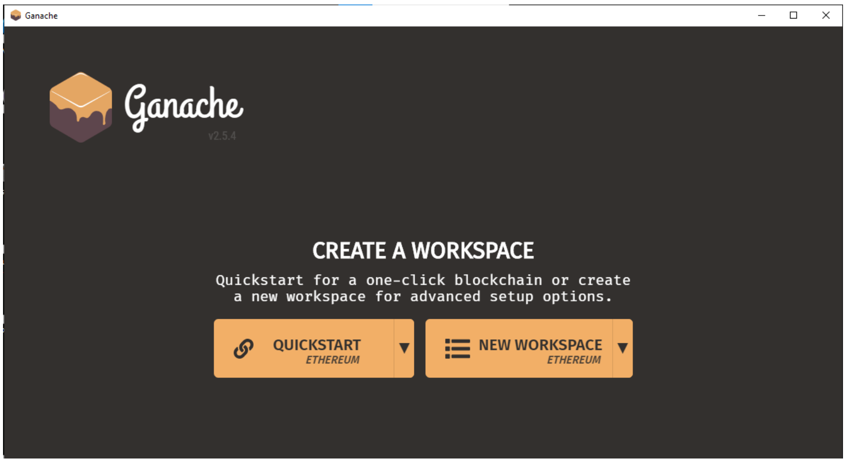
is initiated with the smart contract, if most people who participate in the project agree to the request by voting, the donation funds of the project will be transferred from the Dapp administrator account to the beneficiary account.

IV. PROJECT PURPOSE

In existing charity applications everything is done manually, so Blockchain technology is a structure that stores transactional records, also known as the block, of the public in several databases, known [41]as the "chain," in a network connected through peer-to-peer nodes. [42]Typically, this storage is referred to as a 'digital ledger. The main theme of the project is to give the public a genuine and true platform on which they can donate their goods without the third party and faith assurance. The enhancement is done with the help of blockchain technology because no alteration is possible and also no one can cheat in the system as all the transactions are transparent to everyone.

V. EXPERIMENTAL RESULT

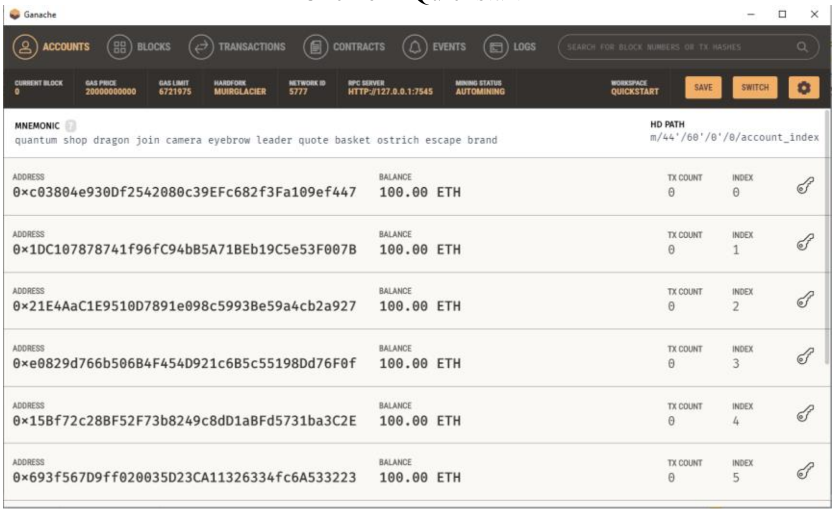
Steps required for starting the charity application:
Ganache-
Ganache is used for setting up a personal Ethereum Blockchain. It is also used for testing the Solidity contracts. It provides more features in comparison to Remix.
Opening ganache-
Ganache Desktop-
When we start Ganache the following screen appears shown below –



CREATE A WORKSPACE

Quickstart for a one-click blockchain or create a new workspace for advanced setup options.

Click on "Quickstart"



CURRENT BLOCK 0 · GAS PRICE 20000000000 · GAS LIMIT 6721975 · HARDFORK MUIRGLACIER · NETWORK ID 5777 · RPC SERVER HTTP://127.0.0.1:7545 · MINING STATUS AUTOMINING · WORKSPACE QUICKSTART

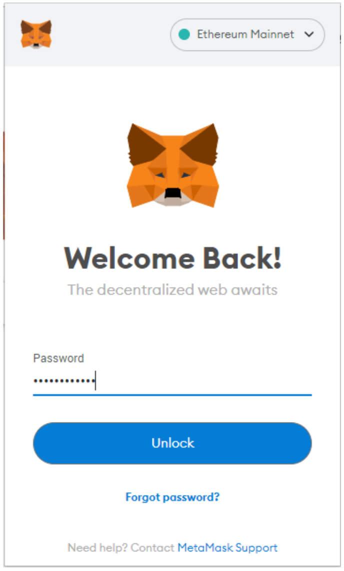
MNEMONIC
quantum shop dragon join camera eyebrow leader quote basket ostrich escape brand

HD PATH
m/44'/60'/0'/0/account_index

ADDRESS	BALANCE	TX COUNT	INDEX
0×c03804e930Df2542080c39EFc682f3Fa109ef447	100.00 ETH	0	0
0×1DC107878741f96fC94bB5A71BEb19C5e53F007B	100.00 ETH	0	1
0×21E4AaC1E9510D7891e098c5993Be59a4cb2a927	100.00 ETH	0	2
0×e0829d766b506B4F454D921c6B5c55198Dd76F0f	100.00 ETH	0	3
0×15Bf72c28BF52F73b8249c8dD1aBFd5731ba3C2E	100.00 ETH	0	4
0×693f567D9ff020035D23CA11326334fc6A533223	100.00 ETH	0	5

The console within the above screenshot shows two user accounts with balance of 100 ETH (Ether - a currency for transaction on Ethereum platform). It also shows a transaction count of zero for every account. As the user has not performed any transactions thus far, this count is clearly zero.
Opening Metamask
MetaMask may be a software cryptocurrency wallet wont to interact with the Ethereum blockchain. It allows users to access their Ethereum wallet through a browser extension or mobile app, which may then be wont to interact with

decentralized applications.MetaMask, is developed by ConsenSys Software Inc., a blockchain software company focusing on Ethereum-based tools and infrastructure.
When Metamask starts, the Metamask screen will appear as shown below –
Enter your password then click on Unlock



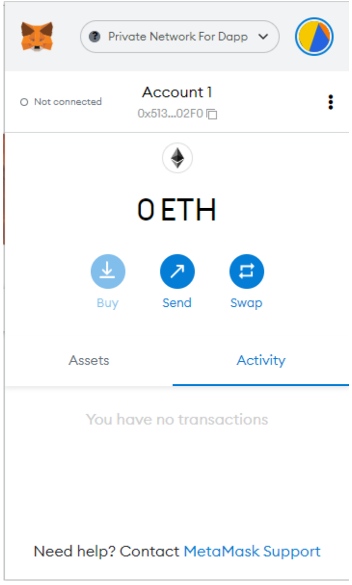
Welcome Back!

The decentralized web awaits

Password: ••••••••••••

Need help? Contact MetaMask Support

Then the following screen will appear



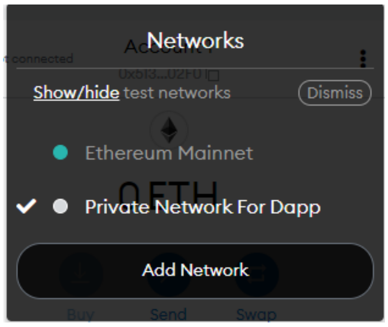
Account 1
0x513...02F0

0 ETH

You have no transactions

Need help? Contact MetaMask Support

Set your network to Private Network ForDapp by clicking on the three dots present on the right side of your Metamask screen.



● Ethereum Mainnet

✓ ● Private Network For Dapp

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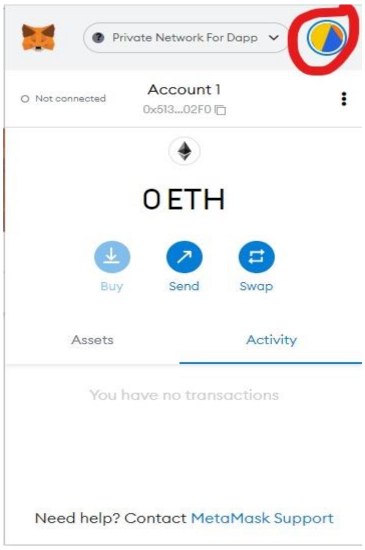
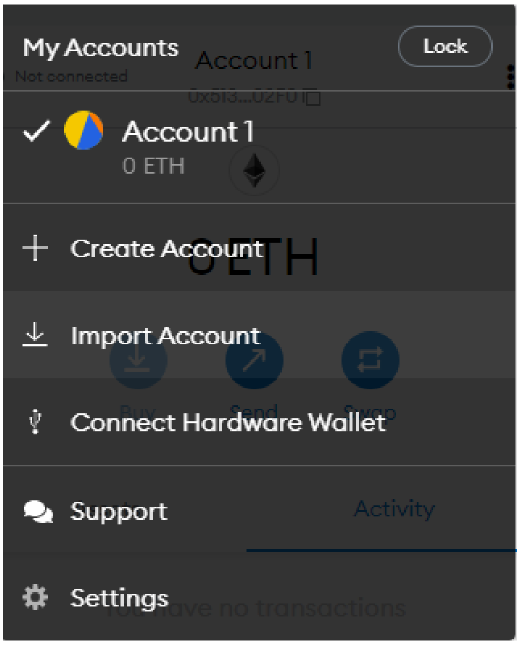
Now we have to create 2 accounts to make transactions 1 for the Doner ,the doner is the one who will donates it's good to the beneficiary(a person who derives advantage from something) and the 2nd account for the beneficiary(the one who receives goods).
So for creating the account click on the symbol marked in red.



You have no transactions

Need help? Contact MetaMask Support

Then create on Import Account.



The following screen will appear

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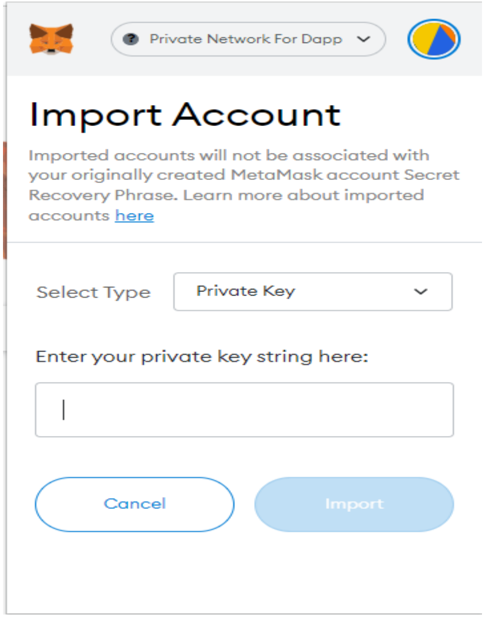


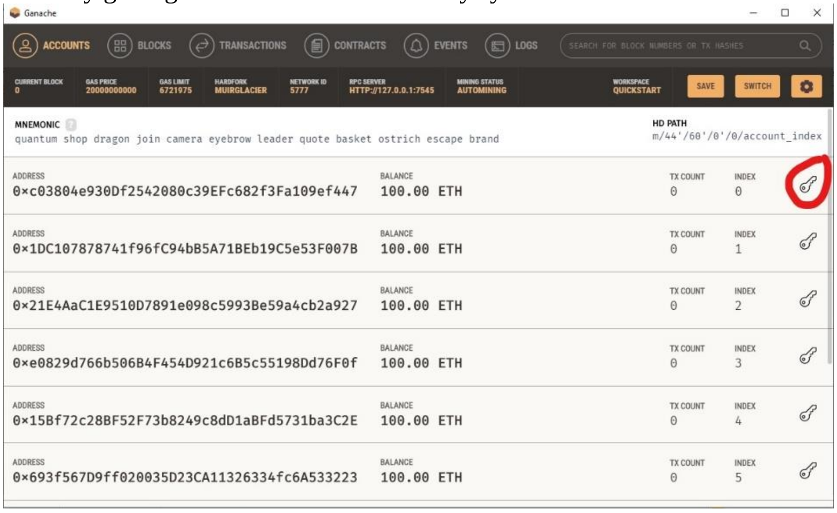
Import Account

Imported accounts will not be associated with your originally created MetaMask account Secret Recovery Phrase. Learn more about imported accounts here

Select Type: Private Key

Enter your private key string here:

In order to get our private key go to ganache and click on the key symbol marked in red.



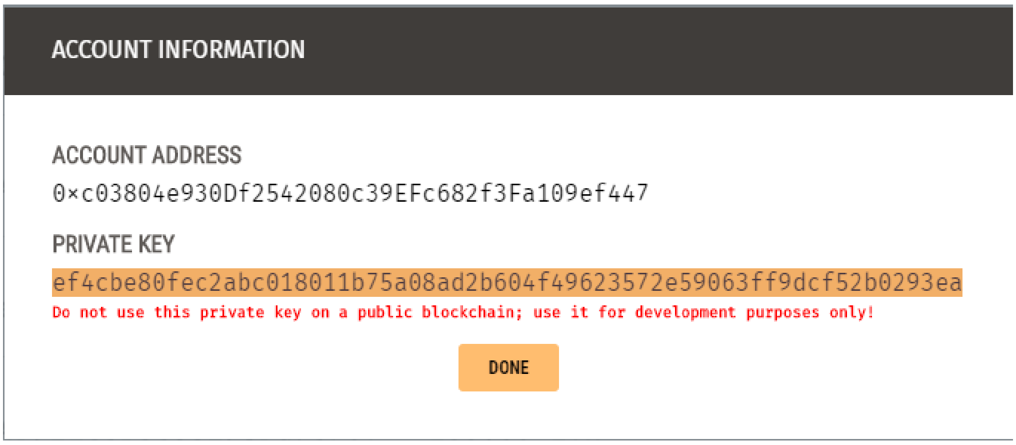
CURRENT BLOCK	GAS PRICE	GAS LIMIT	HARDFORK	NETWORK ID	RPC SERVER	MINING STATUS	WORKSPACE
0	20000000000	6721975	MUIRGLACIER	5777	HTTP://127.0.0.1:7545	AUTOMINING	QUICKSTART

MNEMONIC
quantum shop dragon join camera eyebrow leader quote basket ostrich escape brand

HD PATH
m/44'/60'/0'/0/account_index

ADDRESS	BALANCE	TX COUNT	INDEX
0×c03804e930Df2542080c39EFc682f3Fa109ef447	100.00 ETH	0	0
0×1DC107878741f96fC94bB5A71BEb19C5e53F007B	100.00 ETH	0	1
0×21E4AaC1E9510D7891e098c5993Be59a4cb2a927	100.00 ETH	0	2
0×e0829d766b506B4F454D921c6B5c55198Dd76F0f	100.00 ETH	0	3
0×15Bf72c28BF52F73b8249c8dD1aBFd5731ba3C2E	100.00 ETH	0	4
0×693f567D9ff020035D23CA11326334fc6A533223	100.00 ETH	0	5

After clicking on it we will get our private key as well as our account information.



ACCOUNT INFORMATION

ACCOUNT ADDRESS
0×c03804e930Df2542080c39EFc682f3Fa109ef447

PRIVATE KEY
ef4cbe80fec2abc018011b75a08ad2b604f49623572e59063ff9dcf52b0293ea

Do not use this private key on a public blockchain; use it for development purposes only!

Then go to Metamask and paste our private key

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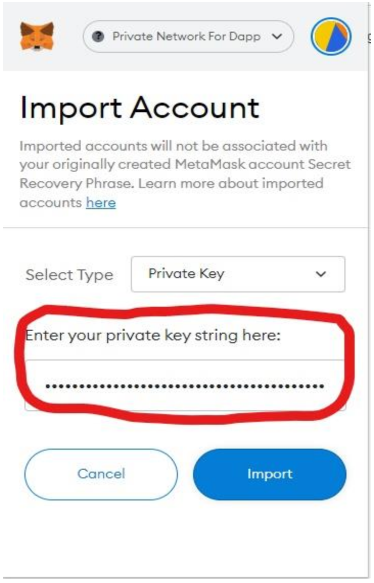


Private Network For Dapp

Import Account

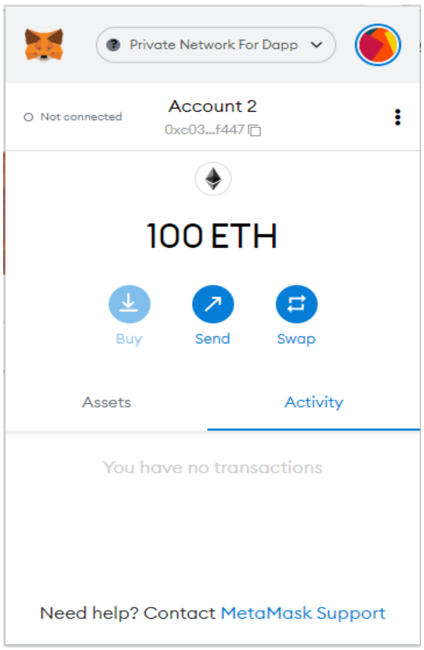
Imported accounts will not be associated with your originally created MetaMask account Secret Recovery Phrase. Learn more about imported accounts here

Select Type: Private Key

Enter your private key string here:

••

And click on Import.



Private Network For Dapp

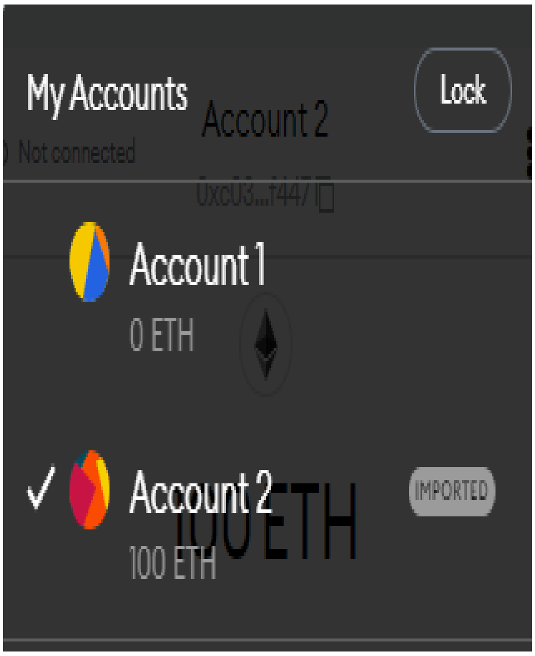
○ Not connected

Account 2
0xc03...f447

100 ETH

You have no transactions

Need help? Contact MetaMask Support

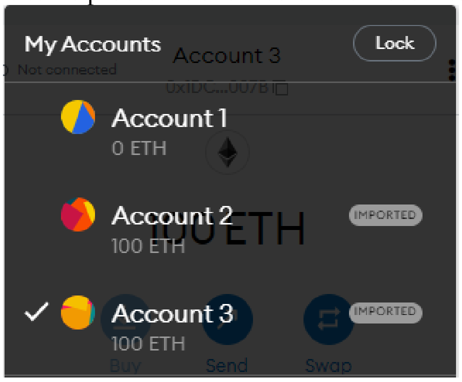


My Accounts

Account 1
0 ETH

✓ Account 2 IMPORTED
100 ETH

The account will get created. Follow the same procedure and also create Account3.



My Accounts

Account 1
0 ETH

Account 2 IMPORTED
100 ETH

✓ Account 3 IMPORTED
100 ETH

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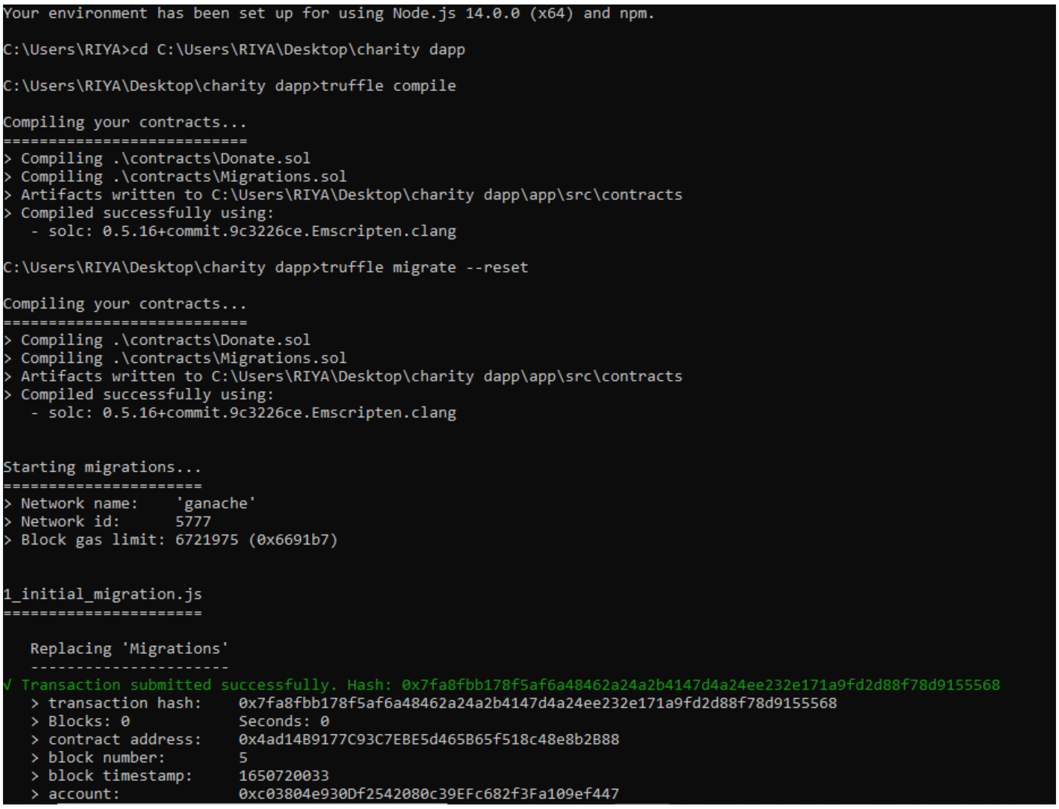
In this way we have created 2 accounts
The donor
The beneficiary
Now go to Node.js command prompt and run the following commands-
Node.js is an open-source, cross-platform, back-end JavaScript runtime environment that runs on the V8 engine and executes JavaScript code outside a web browser.
Truffle is a development environment, testing framework and asset pipeline for Ethereum, aiming to make life as an Ethereum developer easier. With Truffle, you get:
Built-in smart contract compilation, linking, deployment and binary management.
Automated contract testing with Mocha and Chai.
Configurable build pipeline with support for custom build processes.
Scriptable deployment & migrations framework.
Network management for deploying to many public & private networks.
Interactive console for direct contract communication.
Instant rebuilding of assets during development.
External script runner that executes scripts within a Truffle environment.

Commands

1. **cd C:\Users\RIYA\Desktop\charity dapp**
2. **truffle compile**
3. **truffle migrate –reset**
4. **cd app**
5. **npm run start**



```
Your environment has been set up for using Node.js 14.0.0 (x64) and npm.

C:\Users\RIYA>cd C:\Users\RIYA\Desktop\charity dapp

C:\Users\RIYA\Desktop\charity dapp>truffle compile

Compiling your contracts...
===========================
> Compiling .\contracts\Donate.sol
> Compiling .\contracts\Migrations.sol
> Artifacts written to C:\Users\RIYA\Desktop\charity dapp\app\src\contracts
> Compiled successfully using:
   - solc: 0.5.16+commit.9c3226ce.Emscripten.clang

C:\Users\RIYA\Desktop\charity dapp>truffle migrate --reset

Compiling your contracts...
===========================
> Compiling .\contracts\Donate.sol
> Compiling .\contracts\Migrations.sol
> Artifacts written to C:\Users\RIYA\Desktop\charity dapp\app\src\contracts
> Compiled successfully using:
   - solc: 0.5.16+commit.9c3226ce.Emscripten.clang


Starting migrations...
======================
> Network name:    'ganache'
> Network id:      5777
> Block gas limit: 6721975 (0x6691b7)


1_initial_migration.js
======================

   Replacing 'Migrations'
   ----------------------
√ Transaction submitted successfully. Hash: 0x7fa8fbb178f5af6a48462a24a2b4147d4a24ee232e171a9fd2d88f78d9155568
   > transaction hash:    0x7fa8fbb178f5af6a48462a24a2b4147d4a24ee232e171a9fd2d88f78d9155568
   > Blocks: 0            Seconds: 0
   > contract address:    0x4ad14B9177C93C7EBE5d465B65f518c48e8b2B88
   > block number:        5
   > block timestamp:     1650720033
   > account:             0xc03804e930Df2542080c39EFc682f3Fa109ef447
```

International Journal of Advanced Research in Computer and Communication Engineering

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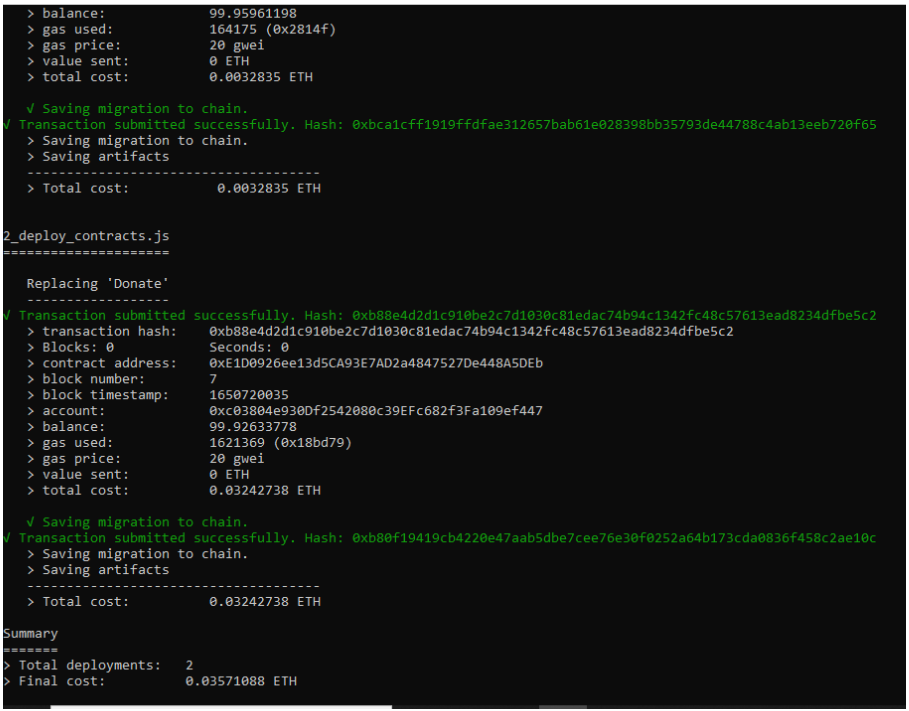
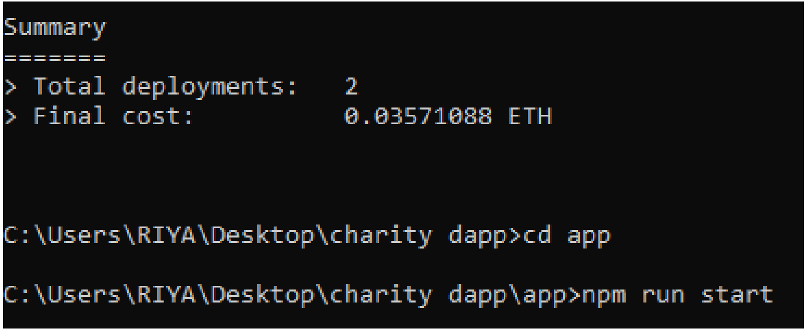
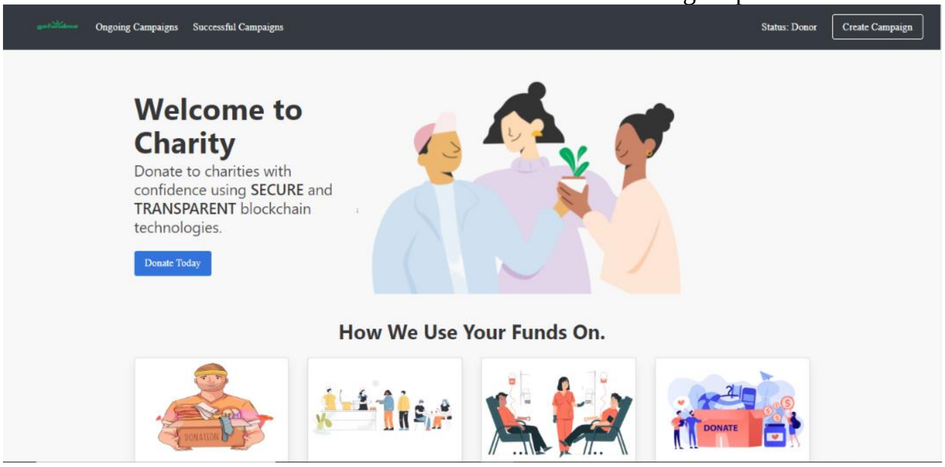


```
   > balance:             99.95961198
   > gas used:            164175 (0x2814f)
   > gas price:           20 gwei
   > value sent:          0 ETH
   > total cost:          0.0032835 ETH

   √ Saving migration to chain.
√ Transaction submitted successfully. Hash: 0xbca1cff1919ffdfae312657bab61e028398bb35793de44788c4ab13eeb720f65
   > Saving migration to chain.
   > Saving artifacts
   -------------------------------------
   > Total cost:           0.0032835 ETH


2_deploy_contracts.js
=====================

   Replacing 'Donate'
   ------------------
√ Transaction submitted successfully. Hash: 0xb88e4d2d1c910be2c7d1030c81edac74b94c1342fc48c57613ead8234dfbe5c2
   > transaction hash:    0xb88e4d2d1c910be2c7d1030c81edac74b94c1342fc48c57613ead8234dfbe5c2
   > Blocks: 0            Seconds: 0
   > contract address:    0xE1D0926ee13d5CA93E7AD2a4847527De448A5DEb
   > block number:        7
   > block timestamp:     1650720035
   > account:             0xc03804e930Df2542080c39EFc682f3Fa109ef447
   > balance:             99.92633778
   > gas used:            1621369 (0x18bd79)
   > gas price:           20 gwei
   > value sent:          0 ETH
   > total cost:          0.03242738 ETH

   √ Saving migration to chain.
√ Transaction submitted successfully. Hash: 0xb80f19419cb4220e47aab5dbe7cee76e30f0252a64b173cda0836f458c2ae10c
   > Saving migration to chain.
   > Saving artifacts
   -------------------------------------
   > Total cost:          0.03242738 ETH

Summary
=======
> Total deployments:   2
> Final cost:          0.03571088 ETH
```



```
Summary
=======
> Total deployments:   2
> Final cost:          0.03571088 ETH



C:\Users\RIYA\Desktop\charity dapp>cd app

C:\Users\RIYA\Desktop\charity dapp\app>npm run start
```

Now wait for some time and now our website will get opened.

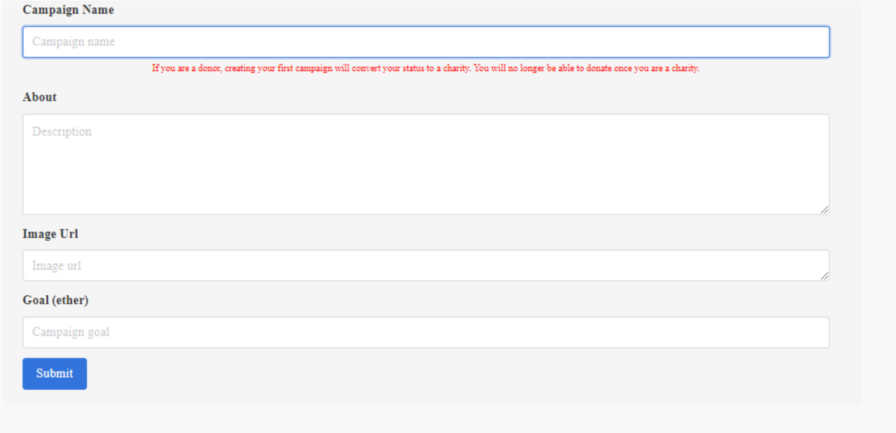


Welcome to Charity

Donate to charities with confidence using SECURE and TRANSPARENT blockchain technologies.

How We Use Your Funds On.

If a beneficiary wants to create his charity project then can do the following steps to get the funds from the doner.
Step 1-
Click on Create Campaign present on the right side of the corner of the website.
The following page will get opened and now the beneficiary has to fill all the required details asked for.



Campaign Name

Campaign name

If you are a donor, creating your first campaign will convert your status to a charity. You will no longer be able to donate once you are a charity.

About

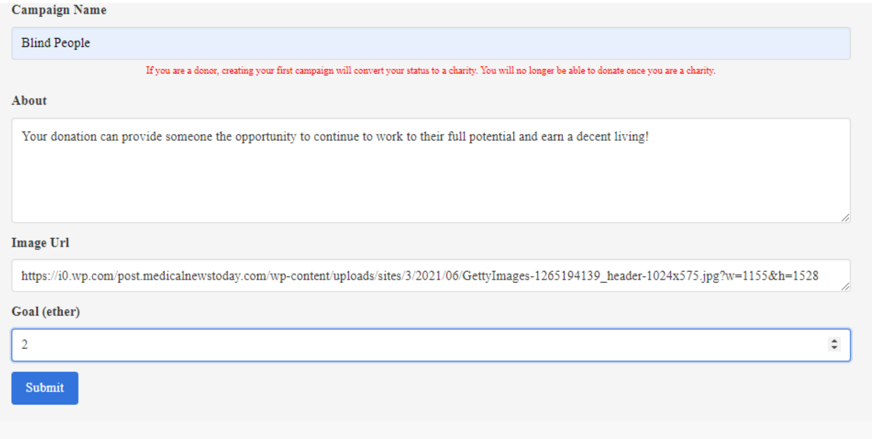
Description

Image Url

Image url

Goal (ether)

Campaign goal



Campaign Name

Blind People

If you are a donor, creating your first campaign will convert your status to a charity. You will no longer be able to donate once you are a charity.

About

Your donation can provide someone the opportunity to continue to work to their full potential and earn a decent living!

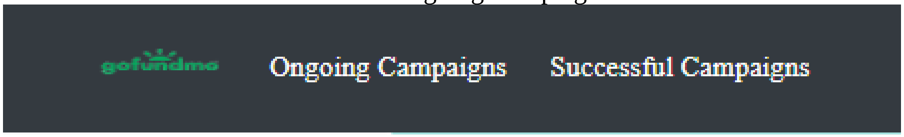
Image Url

https://i0.wp.com/post.medicalnewstoday.com/wp-content/uploads/sites/3/2021/06/GettyImages-1265194139_header-1024x575.jpg?w=1155&h=1528

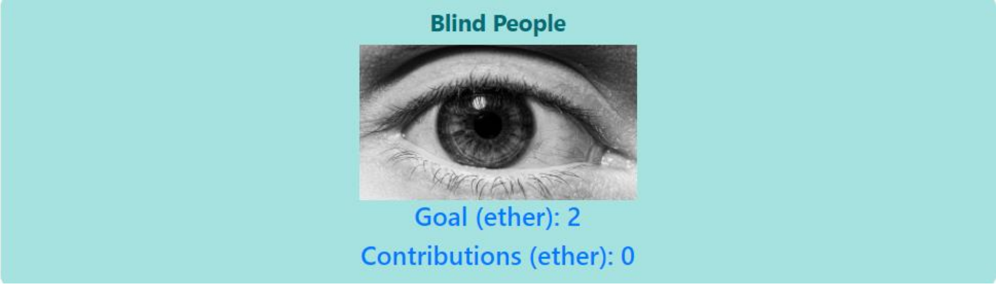
Goal (ether)

2

After filling all the required information click on Submit button.
Click on Ongoing Campaigns



Then we will be able to see our charity project.

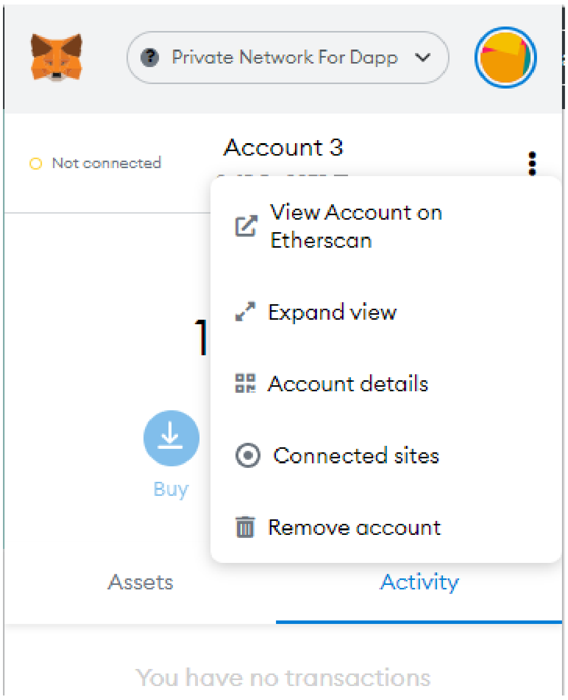


Blind People

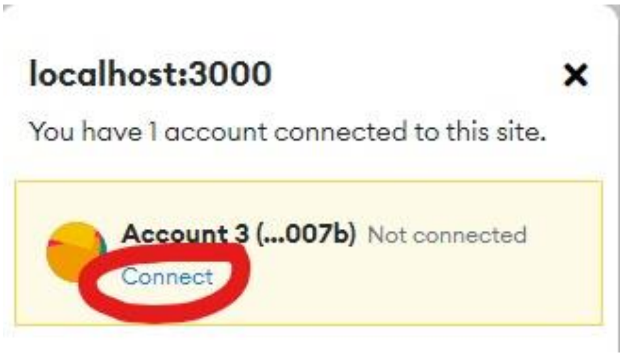
Goal (ether): 2

Contributions (ether): 0

Now, if a doner wants to donate his fund for the Blind people then he has to follow the following steps-
Go to Metamask and click on Connected Sites.



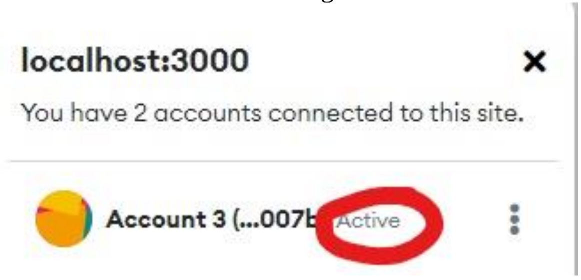
Click on Connect


localhost:3000

You have 1 account connected to this site.

Account 3 (...007b) Not connected

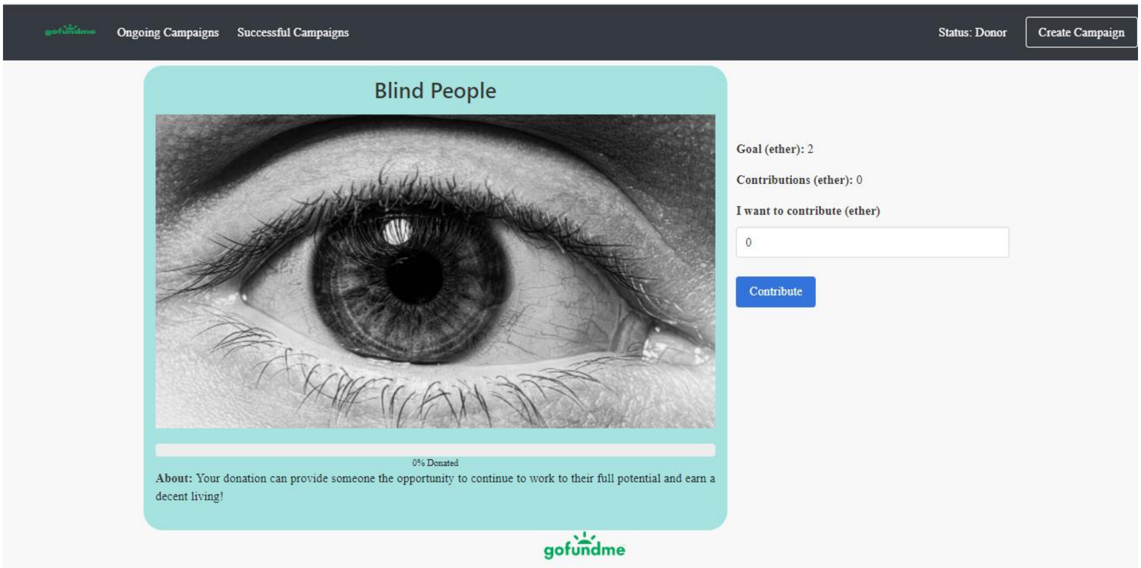
As you can see that your account is in Active state which means that you are allowed to do or perform your transaction the following site.


localhost:3000

You have 2 accounts connected to this site.

Account 3 (...007b Active

Now you just need to fill the amount of ethers you have to pay to the beneficiary



Blind People

Goal (ether): 2

Contributions (ether): 0

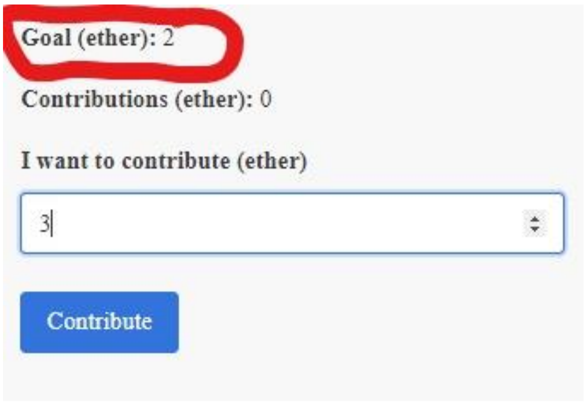
I want to contribute (ether)

0

0% Donated

About: Your donation can provide someone the opportunity to continue to work to their full potential and earn a decent living!

The beneficiary needs (2) ethers.



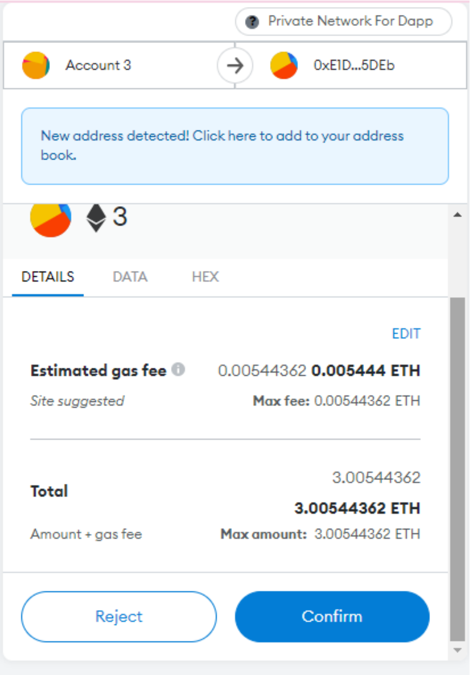
Goal (ether): 2

Contributions (ether): 0

I want to contribute (ether)

3

And the doner is willing to contribute 3 Etherums, so you can just enter the amount as 3 as shown. And click on contribute.



Account 3 → 0xE1D...5DEb

New address detected! Click here to add to your address book.

3

Estimated gas fee 0.00544362 **0.005444 ETH**

Site suggested Max fee: 0.00544362 ETH

Total 3.00544362

3.00544362 ETH

Amount + gas fee Max amount: 3.00544362 ETH

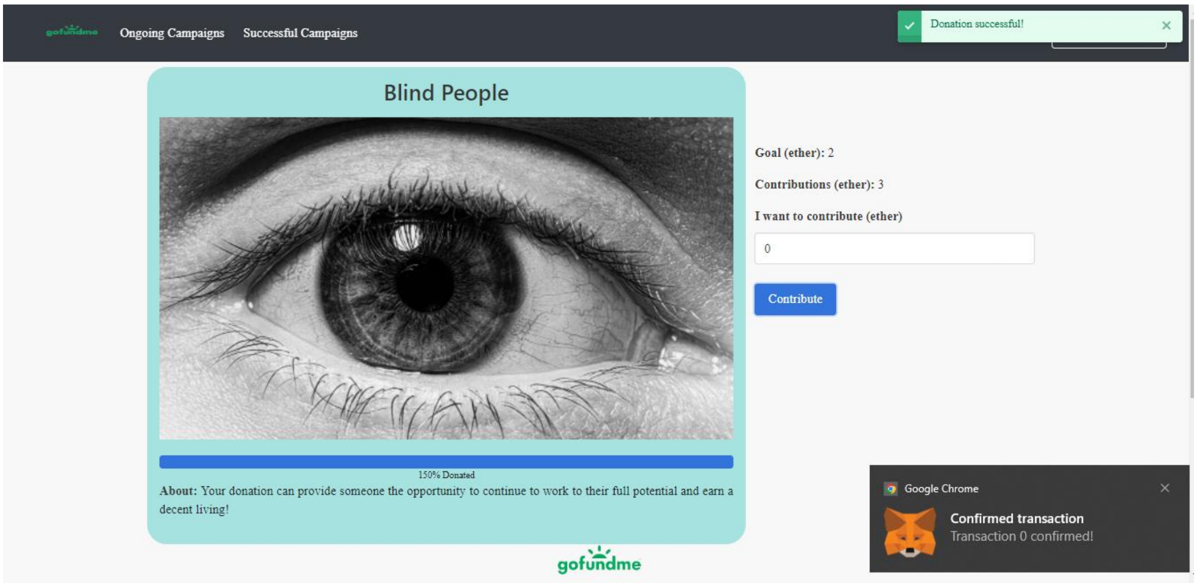
The following window gets popped up by Metamask. Then click on Confirm.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 7.39 ⁜ Vol. 11, Issue 5, May 2022

DOI: 10.17148/IJARCCE.2022.11558



Donation successful!

Blind People

Goal (ether): 2

Contributions (ether): 3

I want to contribute (ether)

0

150% Donated

About: Your donation can provide someone the opportunity to continue to work to their full potential and earn a decent living!

Google Chrome

Confirmed transaction
Transaction 0 confirmed!

The donation becomes successful.

VI. FUTURE SCOPE

Blockchain technology has a great future worldwide. An incredible scope of blockchain technology has been observed within the financial field. Blockchain technology helps charities become more transparent.
In the future, we may even see accountability for the spending of donations tied to smart contracts, enabling donors to donate on to those best during a position to assist .
Blockchain technology increases accountability & reduces the custodian of fund raise issue.
It is also improving workflow and efficiency..

VII. CONCLUSION

We have developed a charity fundraiser Website which is based on Ethereum to verify our system and demonstrate some core functions of the charity platform. The functions of creating project, donating, approving funds and checking the Transactions.

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