

SUMMER INTERNSHIP PROGRAM 2020

BLOCKENCUESTA

A BLOCKCHAIN BASED VOTING SYSTEM

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An abstract geometric pattern consisting of white lines and dots (nodes) connected to form a network of triangles and polygons. The pattern is set against a teal background that has a subtle gradient, being darker on the left and lighter on the right. The pattern is more dense in the upper right and lower right areas, with some isolated nodes and small clusters in the upper right.

01

INTRODUCTION

INTRODUCTION

INDIA is the biggest democracy in the world. In any democratic nation, elections are the biggest celebrations of this form of ruling. People exercise their democratic freedom by electing their representatives. These elected representatives make rules to govern the nation. Thus election decides the fate of any democratic nation. This is the festival where every opinion matters and every vote matters. If this is the importance of the Election mechanism in a democracy, the question is how fair and independent current election mechanisms and tools are?



The background is a solid teal-blue color. Overlaid on this are several abstract geometric patterns. These consist of white dots (nodes) connected by thin white lines (edges), forming a network of interconnected triangles and polygons. Some of these shapes are larger and more complex, while others are smaller and simpler. The overall effect is a modern, digital, or network-like aesthetic.

02

LIMITATIONS OF EXISTING SYSTEM

LIMITATIONS OF EXISTING SYSTEMS

No solution exists without a problem. Our current voting system is in great questions since long time and even after this, it has still managed to survive. Let's take a look at issues in the existing system and why it needs a reform.



LIMITATIONS OF EXISTING SYSTEM



TAMPERING

In India, for the purpose of voting, EVM (Electronic Voting Machine) is used. Current analysis and researches have shown that EVMs can be tampered easily. Thus in a country where every vote matters, this fault results in uncountable votes being casted to wrong side unknowingly.

In current form of elections, a single entity is responsible for all sorts of processing and there is no way to question or track the transparency of the system.

TRANSPARENCY



SECURITY AND PRIVACY

Once a voter has voted, he/she has no access to verify if the vote casted by them has been casted to the correct side or not. Also, the privacy right of the votes is threatened and is the harsh reality.

LIMITATIONS OF EXISTING SYSTEM



COST OF ELECTION

Current election mechanism is highly complicated and requires high effort and precision as well as wealth to get executed. In a country where millions of population is below poverty line, spending such a huge amount on such a low efficient system is highly arguable and questionable.

Violence and terrifying realities like booth capturing and voting on gunpoint form a part of the conventional system. These results in a very large section of society losing their freedom to exercise democratic power.

TENSION AND VIOLENCE



VOTER PARTICIPATION AND TURNOUT

In the history of Indian general elections, largest voter turnout ever was 67% in 2019. In a country where democracy was born, almost half of the population either fails to let their voices heard or they think their one vote hardly matters. Due to this failure, power goes into wrong hands many times.



03

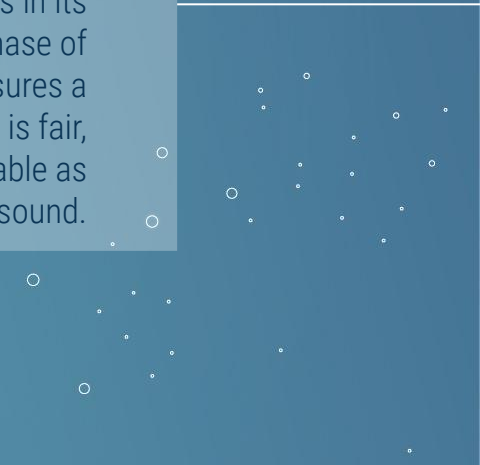
WHY THIS PROJECT?



WHY THIS PROJECT?

Blockencuesta is a solution to roughly all faults in the current voting system. This solution comes up with features sensational and disruptive like never before.

Blockencusta is leveraged using Blockchain which is a glorified database cum network model and is in its overwhelming phase of innovation. This ensures a voting system which is fair, independent and verifiable as well as technically sound.



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WHAT IS BLOCKCHAIN?





WHAT IS BLOCKCHAIN?

Blockchain, being the underlying technology of this project provides it the key features. Blockchain, as the name suggests is nothing else but chain of blocks where each block stores list of transactions (votes)

Blockchain was the technology powering Bitcoin is a digital asset but Blockchain consequently started emerging out of financial boundaries and its disruptive footsteps are now visible in every sector and no doubt it's going to be greater than internet revolution itself



FEATURES OF BLOCKCHAIN



DECENTRALIZED

No individual or any single entity is in charge of the transactions. Each and every connection in Blockchain has the exact copy of transaction logs.



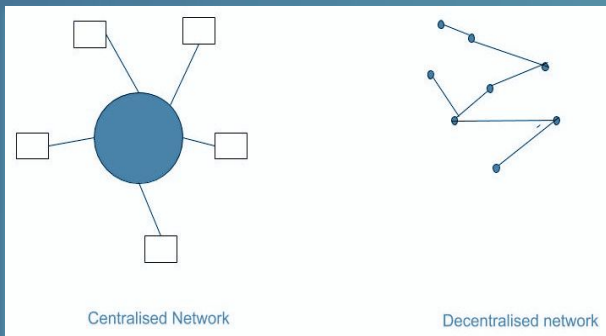
IMMUTABLE

Data stored in Blockchain is immutable and tampering with it is next to impossible. If it happens, tampering detection is easily possible.



PEER TO PEER NETWORK

Blockchain provides interaction between only two parties possible, sender and receiver. Thus, it eliminates the need of "Third Party Authorisation"



Centralised Network

Decentralised network



SECURITY

Blockchain comes up with enhanced security features and stores data using hashing algorithms like SHA 256 which makes it impossible to retract data.



CONSENSUS BASED VALIDATION

Blockchain comes up with consensus based validation (approved by everyone in the network) which ensures proxy transactions or faulty data doesn't get entered within the Blockchain.



RELATIVE USER ANONYMITY

Blockchain data model ensures that transparency of the system is maintained along with maintaining the relative user anonymity.



05

WHY BLOCKCHAIN?

WHY BLOCKCHAIN?

Inheriting below features of Blockchain give it an upper edge over rest of the E- Voting models

VERIFIABILITY

Any voter can cross verify his/her vote if it's casted to the right candidate as exact copy of the transaction logs is available to everyone in the network.



DECENTRALIZATION

The ability of Blockchain to build decentralized networks initiates transparency in the election system and eliminates central point of failure.



TAMPER PROOF

Due to the use of Blockchain in the project, tampering and modifying with data becomes roughly impossible due to its unique architecture and if any tampering action is performed, this will not reflect on the public network and will be detected easily.



PRIVACY AND ANONYMITY

Though ensuring the transparency of the system using distributed ledger, the privacy of one's own vote is always protected as the use of wallet address in ledgers ensures anonymity of voter.





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PROJECT DESCRIPTION

PROJECT DESCRIPTION

Smart Contract, being the soul of the project, contains the rules of the elections coded using Solidity language or the backend logic and storage. The client interface has been designed using HTML, CSS and JS. The main motive of the DApp website is to ensure that every vote is secure and not tampered with. Registration of voters is a different counterpart of the project and is something which can easily be integrated later on. For the sake of this project, we have already assumed that a voter has already got himself enrolled in voter list and has got himself a wallet address and private key which is unique to that specific voter only.

The wallet address of a user is like **Public Key** to him and can be known to everyone in the network. Protecting his/her **Private Key** is his/her own responsibility. A voter can use his/her private key to access his account and log into the voting portal to gain access to voting process. The website checks if the account has authorized access to vote or if it is in the voter list. The access is allowed only to the legitimate voters and proxy private keys are denied access. After the vote is casted, it gets stored into the Blockchain (local blockchain in this case is Ganache) and is safe and verifiable. The admin has access to the vote count but the admin cannot change the votes thus preventing it to become a point of failure. Once voting is over, admin can broadcast results after using media or communication techniques. The Vote count visibility is disabled for user to avoid any circumstances of power dominance. Thus, it ensures **a completely different experience of Democratic Freedom** which is technically sound and idealistic simultaneously.

To check how it works, [CLICK HERE](#)



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TOOLS USED



FOR AN ADMIN

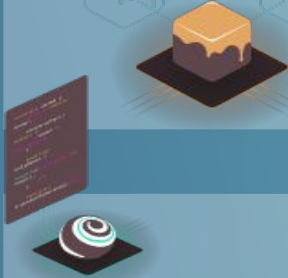
**NODE JS
GANACHE
TRUFFLE
METAMASK**

FOR A VOTER

METAMASK PLUGIN.



Ganache is a local blockchain. It will give us 10 accounts with addresses and 100 fake ether. It gives us a complete detail about accounts, blocks, transactions, logs, contracts and events.



GANACHE

Truffle allows us to build dapps on the Ethereum blockchain. It provides tools that allows us to write smart contracts. It not only enables us to test our smart contracts and deploy them to the blockchain but also gives us a place to develop our client-side application.

TRUFFLE

This is a special browser extension for Google Chrome. By this we will be able to connect to our local Ethereum blockchain with our personal account, and interact with our smart contract.

METAMASK



METAMASK

NODE JS



It provides us with a wide range of packages available which can be accessed through npm



08

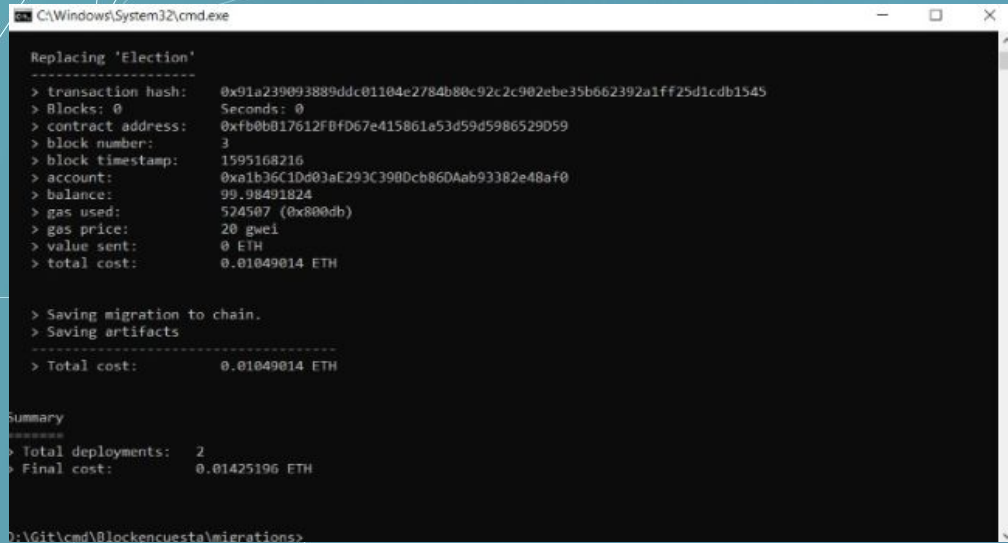
HOW TO USE ?

HOW TO USE?

As of now, Blockencuesta is a local prototype which can be downloaded from this [GitHub link](#). To run this over a local machine, dependencies mentioned in the previous slide must be installed.

STEP 1:

After downloading the files, use command prompt to reach the concerned folder or directory and use the command **Truffle migrate** in command prompt to deploy the contract over Blockchain.
(Note: Ganache's quick workspace should also be open at the same time)



```
C:\Windows\System32\cmd.exe

Replacing 'Election'
-----
> transaction hash:    0x91a239093889ddc01104e2784b80c92c2c902ebe35b662392a1ff25d1cdb1545
> Blocks: 0           Seconds: 0
> contract address:   0xfbb0b17612f8fd67e415861e53d59d5986529D59
> block number:       3
> block timestamp:    1595168216
> account:            0xa1b36C1Dd03aE293C390Dcb86DAab93382e48af0
> balance:            99.98491824
> gas used:           524507 (0x800db)
> gas price:          20 gwei
> value sent:         0 ETH
> total cost:         0.01049014 ETH

> Saving migration to chain.
> Saving artifacts
-----
> Total cost:         0.01049014 ETH

Summary
-----
> Total deployments:  2
> Final cost:         0.01425196 ETH

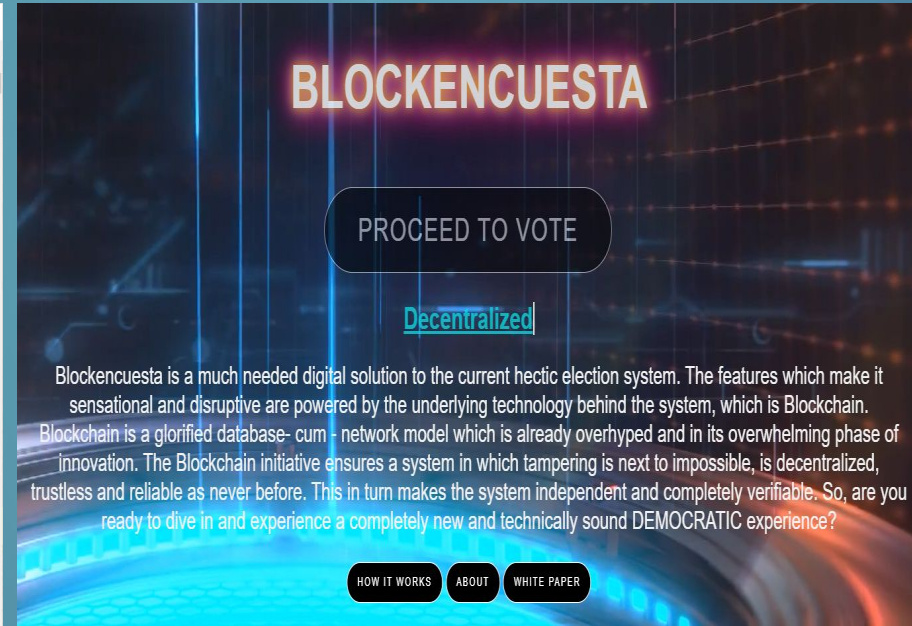
D:\Git\cmd\Blockencuesta\migrations>
```

HOW TO USE?

STEP 2:

Now use the command ***npm run dev*** to run lite-server which will launch a interface on browser automatically.

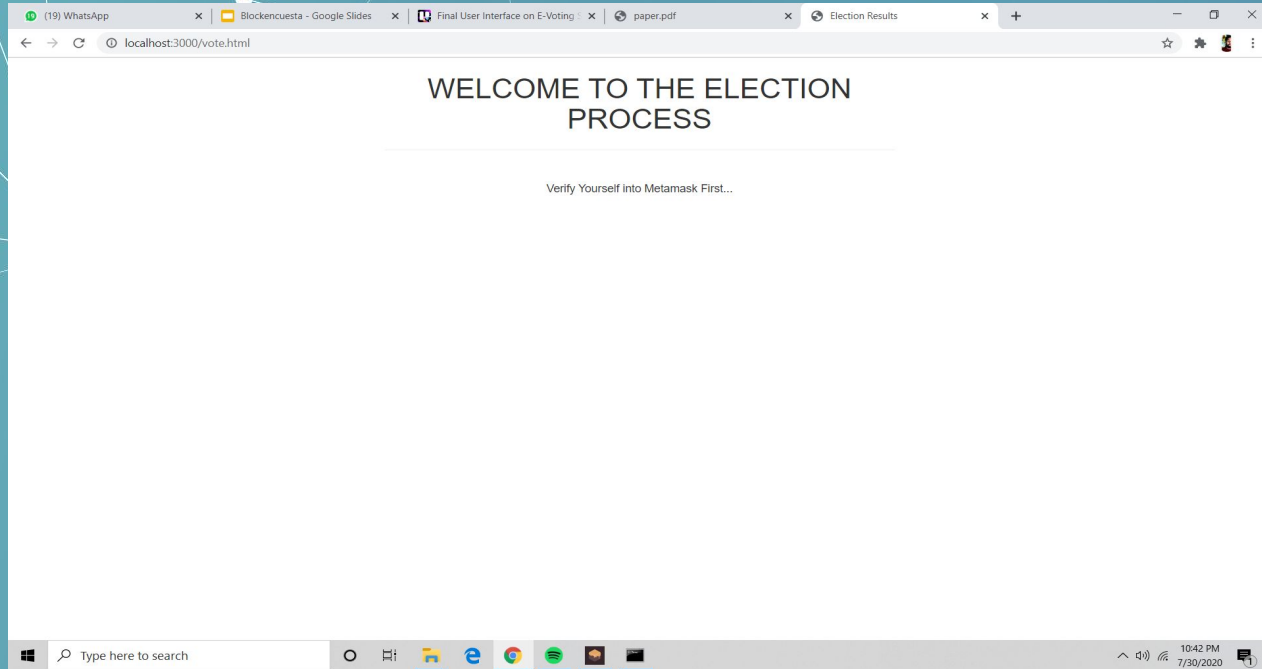
```
lite-server
D:\Git\cmd\election>lite-server
** browser-sync config **
{
  injectChanges: false,
  files: [ './**/*.html', './**/*.css', './**/*.js' ],
  watchOptions: { ignored: 'node_modules' },
  server: {
    baseDir: [ './src', './build/contracts' ],
    middleware: [ [Function (anonymous)], [Function (anonymous)] ]
  }
}
[Browsersync] Access URLs:
-----
  Local: http://localhost:3000
  External: http://192.168.56.1:3000
-----
  UI: http://localhost:3001
  UI External: http://localhost:3001
-----
[Browsersync] Serving files from: ./src
[Browsersync] Serving files from: ./build/contracts
[Browsersync] Watching files...
20.07.23 22:24:11 200 GET /index.html
20.07.23 22:24:11 200 GET /js/bootstrap.min.js
20.07.23 22:24:11 200 GET /css/bootstrap.min.css
20.07.23 22:24:11 200 GET /js/app.js
20.07.23 22:24:11 200 GET /js/web3.min.js
20.07.23 22:24:11 200 GET /js/truffle-contract.js
20.07.23 22:24:12 200 GET /Election.json
```



HOW TO USE?


STEP 3:

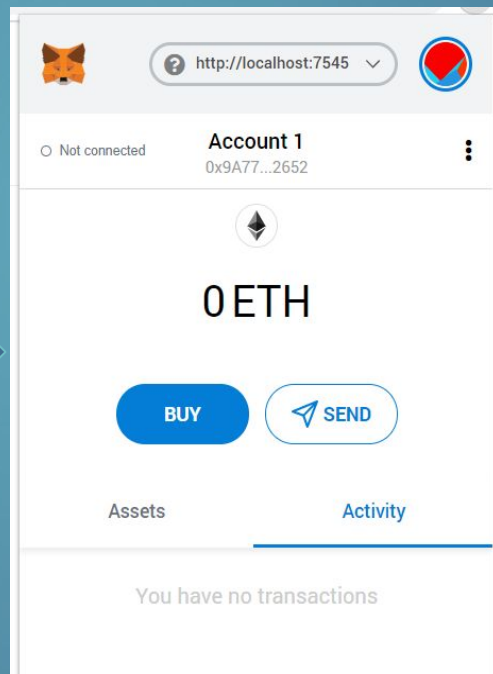
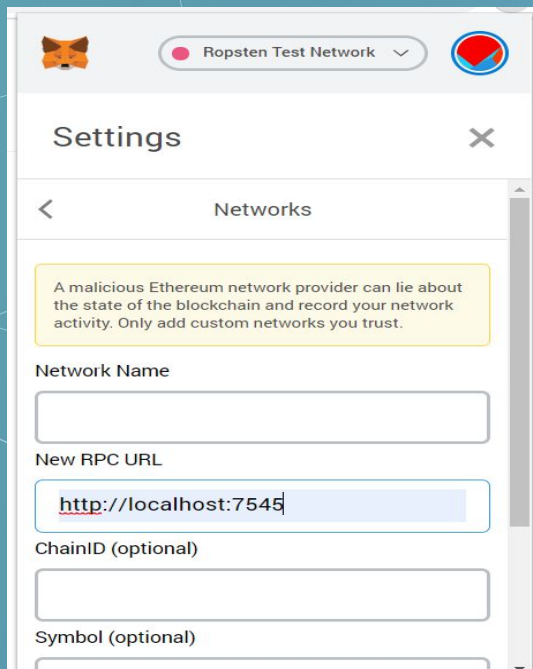
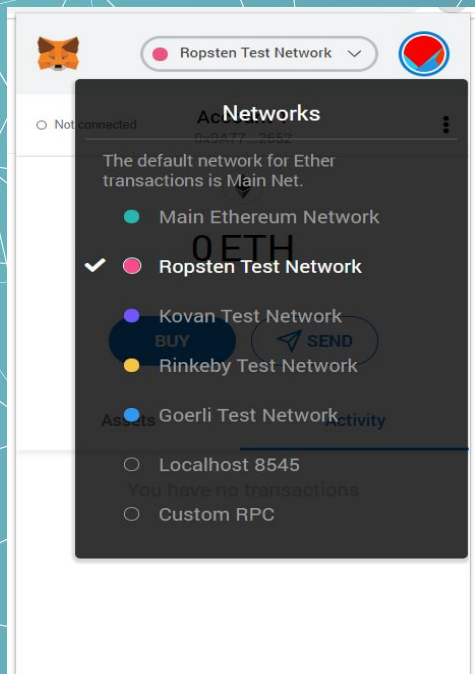
Use the button "PROCEED TO VOTE" to navigate to voting process. This will give you an interface similar to this.



HOW TO USE?

STEP 4:

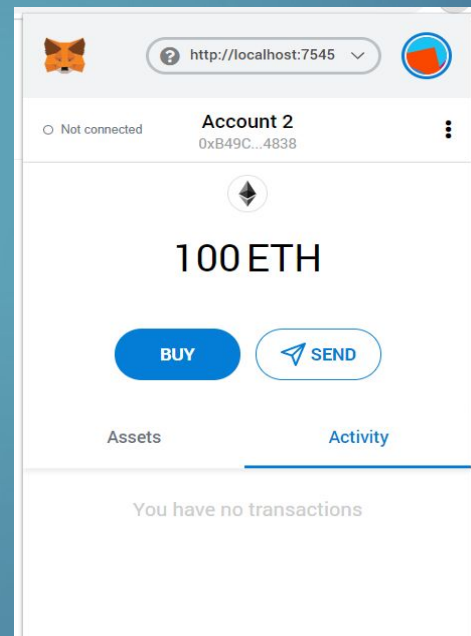
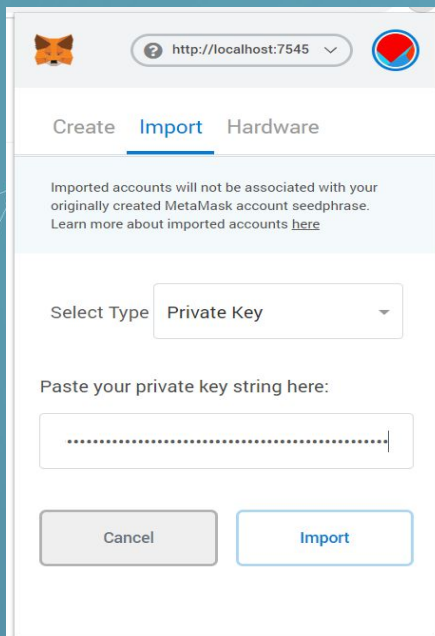
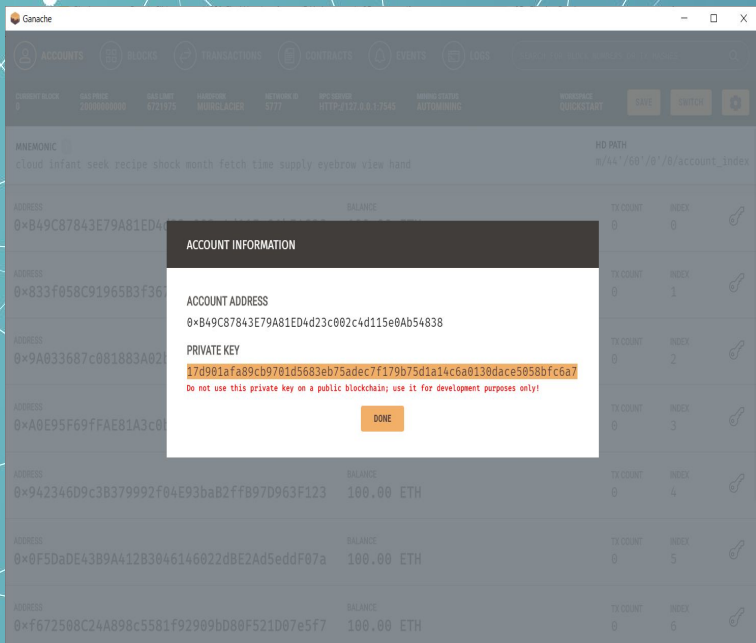
Open Metamask using  option in the top right corner of Google Chrome browser and set up an account into metamask by navigating through the steps. Now click the topmost button to select network and choose custom rpc. Use the address mentioned in picture as New RPC URL and save.



HOW TO USE?

STEP 5:

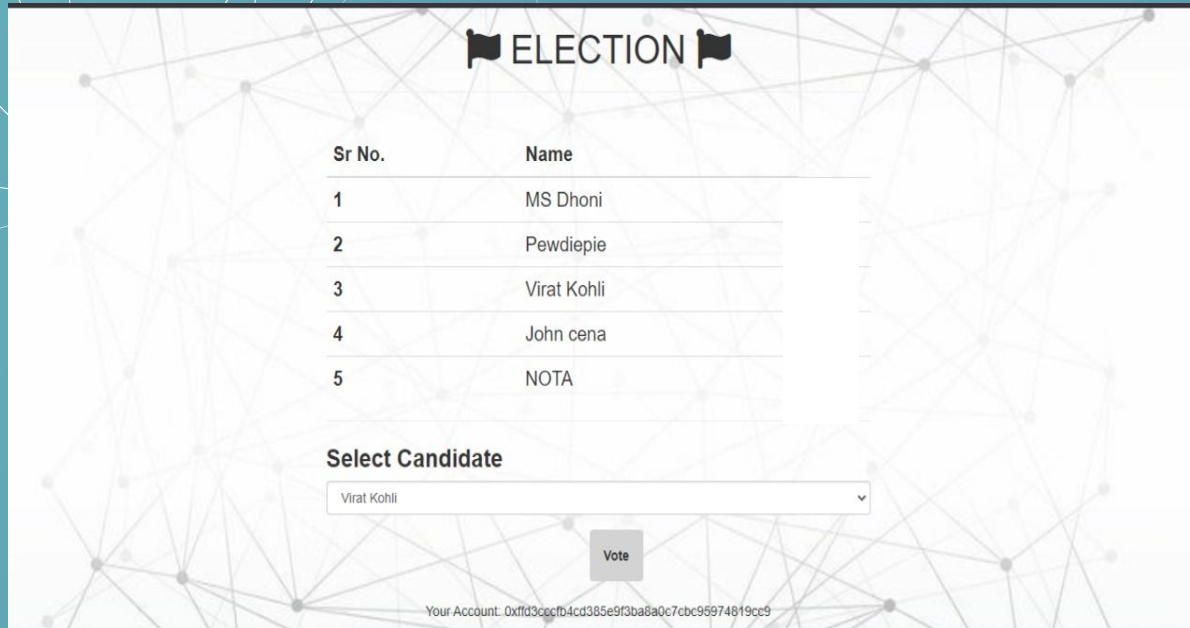
Now open Ganache and copy the private key of a random account. Use this private key into Import account option in top right button to import an account from Ganache.



HOW TO USE?

STEP 6:

Now navigate to "Connected sites" option with the button having 3 dots and connect the Election website with the currently imported account and refresh the website after that to encounter the voting interface.



The screenshot displays a web application titled "ELECTION" with a header featuring two flag icons. Below the header is a table with two columns: "Sr No." and "Name". The table lists five entries: 1 MS Dhoni, 2 Pewdiepie, 3 Virat Kohli, 4 John cena, and 5 NOTA. Below the table is a "Select Candidate" section with a dropdown menu currently showing "Virat Kohli". A "Vote" button is positioned below the dropdown. At the bottom of the interface, a line of text reads "Your Account: 0xf1d3cccfb4cd385e9f3ba8a0c7cbc95974819cc9".

Sr No.	Name
1	MS Dhoni
2	Pewdiepie
3	Virat Kohli
4	John cena
5	NOTA

Select Candidate

Virat Kohli

Vote

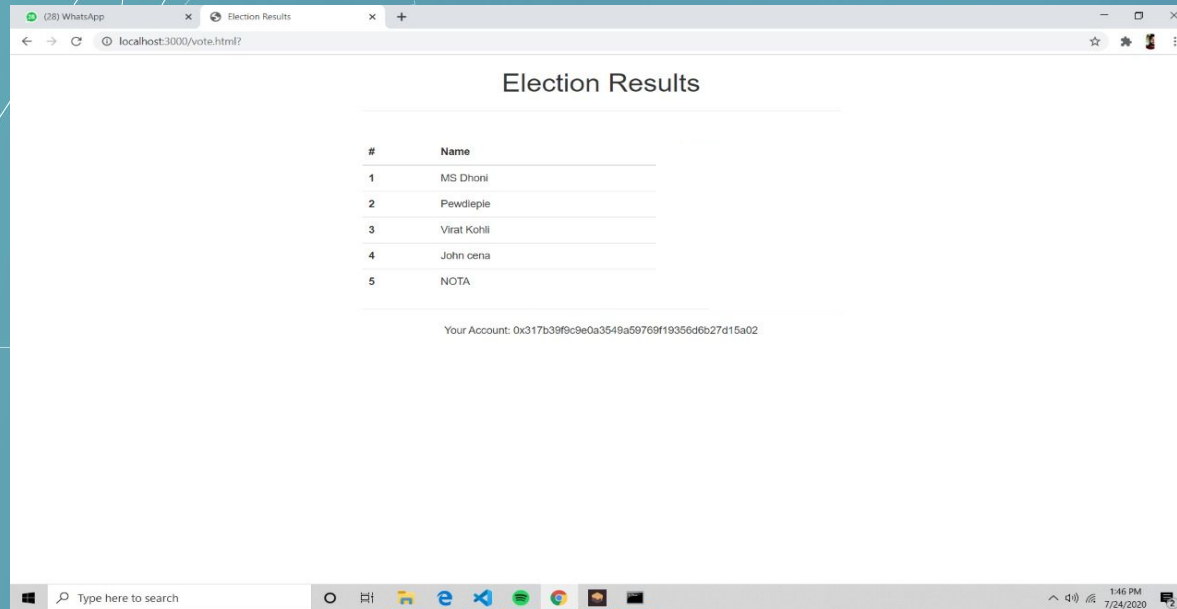
Your Account: 0xf1d3cccfb4cd385e9f3ba8a0c7cbc95974819cc9

HOW TO USE?

STEP 7:

After selecting the desirable candidate through drop-down option, click on the Vote button. A popup through Metamask will appear to validate if transaction or vote was really done by you. Click on the confirm button to cast the vote. The interface will refresh after voting and Vote button will disappear now to avoid double voting. Woah! The Voting process is finished and your vote has been recorded.

Note: Transaction/
voting receipt can
be viewed using
the popped up
notification after
voting.





09

**TECHNICAL
SPECIFICATION
NEEDED**

HARDWARE SPECIFICATIONS

- 1GB RAM (min), dual core 1.7 GHz should be available on voters computer.
- The system must be configured with Pentium IV(min) and higher processor with internet

SOFTWARE INTERFACE

- Operating System: Windows 7+ , Linux, Windows 8
Version:2007,2020
- Language:HTML,CSS,JS,Solidity
- Back-end: Truffle, Ganache
- Plugins: Metamask



10 DRAWBACKS

DRAWBACKS

- Complexity:-Blockchain is a new technology and thus implementing and managing it is hard. On addition, lack of knowledge creates a lot of confusion thus making blockchain complex.
- Blockchain consumes a lot of energy:-Every time the ledger is updated with a new transaction, the miners need to solve the problem which means spending a lot of energy.
- Internet availability and failure:-Even in this digital era, internet speed and network issues continue. For the transaction to take place good internet speed is required.
- Credibility of faults:-Although the voter is verified, there is no guarantee that the vote is legal as the phones can be easily hacked which becomes easier to vote on his/her behalf.
- Self maintenance of wallets:-
- Reversibility:-Once the smart contract is deployed it is very difficult to remove or add a feature.
- Accessibility:-E voting system will result in a huge population losing their right to exercise democratic power.



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FUTURE SCOPES

FUTURE SCOPES

- 1) **Extending the feasibility of the project to mobile and implementing it over public blockchain and ready to use since the project prototype is made to be used over local machine as of now.**
- 2) **To serve the voter registration counterpart, instead of using physical means of registration, we can integrate the registration portal through which any voter could get himself enrolled in Voter List after proper document verification and checking with online submissions.**
- 3) **As of now, Blockencuesta is available only as a DApp website. In future, we plan to move to multiple platforms like Android and IOS.**



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CONCLUSION

CONCLUSION

The idea of adapting digital voting systems is to make the public electoral process cheaper, faster, easier and secured. This system eliminates the third party dependency and thus making the electoral process decentralized and also get instant election results. This is a unique, blockchain-based electronic voting system that utilizes smart contracts to enable secure and cost efficient election while guaranteeing voters privacy. Due to its transparency and tamper-proof property, the data in the decentralized registry cannot be lost and cyber attacked. Last but not the least, it gives liberty to the voters to vote from anywhere in the world.



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REFERENCES

RESOURCES

1)<https://www.dappuniversity.com/articles/the-ultimate-ethereum-dapp-tutorial>

2)<https://chrome.google.com/webstore/detail/metamask/nkbihfboegaeaoehlefnkodbefgpgknn>

3)https://www.tutorialspoint.com/solidity/solidity_types.htm#:~:text=address%20holds%20the%2020%20byte,transfer%20method

4)<https://www.blockdegree.org/courses/blockchain-professional/what-is-ethereum-blockchain#>

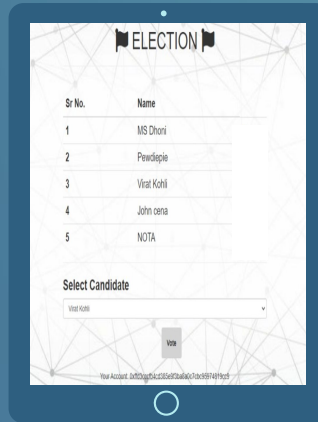
5)<https://www.trufflesuite.com/docs/truffle/overview>

The background is a solid teal color. Overlaid on this are several abstract geometric patterns. On the left side, there is a dense network of white dots connected by thin white lines, forming a complex web of triangles and polygons. Some dots are larger than others. Scattered across the right side and bottom are smaller, more isolated geometric shapes, including triangles and small clusters of dots connected by lines. The overall aesthetic is modern and tech-oriented.

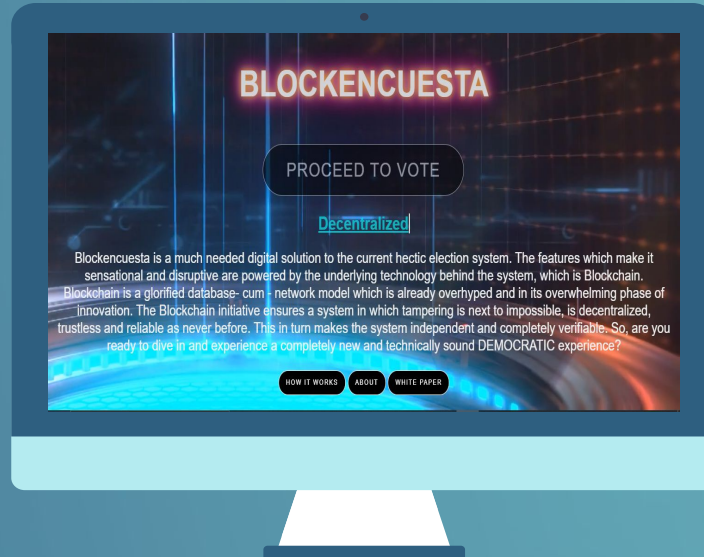
14

SNEAK PEEK

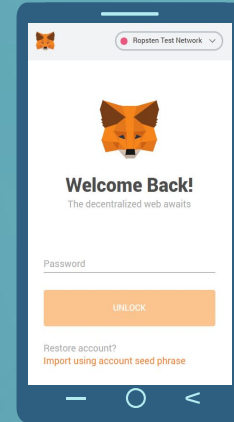
SNEAK PEEK



Election Interface



HOME PAGE



Metamask popup



15

TEAM DESCRIPTION

TEAM DESCRIPTION



**ADITYA
ASHUTOSH**

(Team Leader)



**ANKIT
GUPTA**

(MENTOR)



**GEERVANI
REDDY**

(Documentation)



SANKET KOLTE

**(Member of
Frontend Team)**



AJINKYA TAT

**(Member of
Backend Team)**



THANK YOU
