IoT Data Marketplace Using Blockchain

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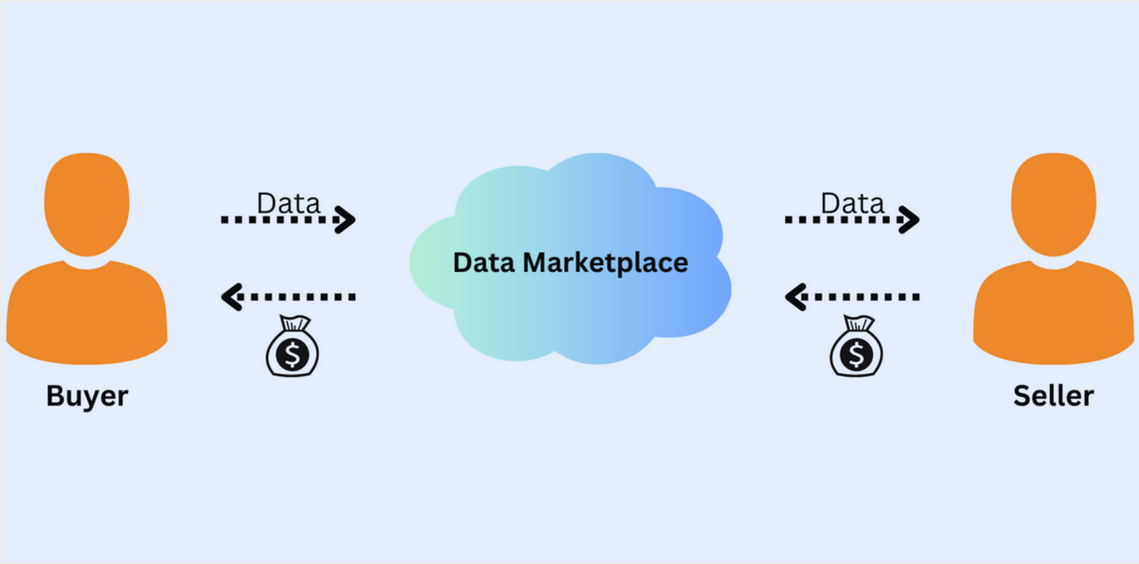
OVERVIEW

INTRODUCTION

IoT devices generate a lot of data shared over the internet. Data marketplaces provide a platform for buying and selling data, with a potential for significant financial gain.



PROBLEM

Centralized data marketplaces face several challenges such as high infrastructure costs, trust and privacy issues, and single points of failure.

SOLUTION

Blockchain

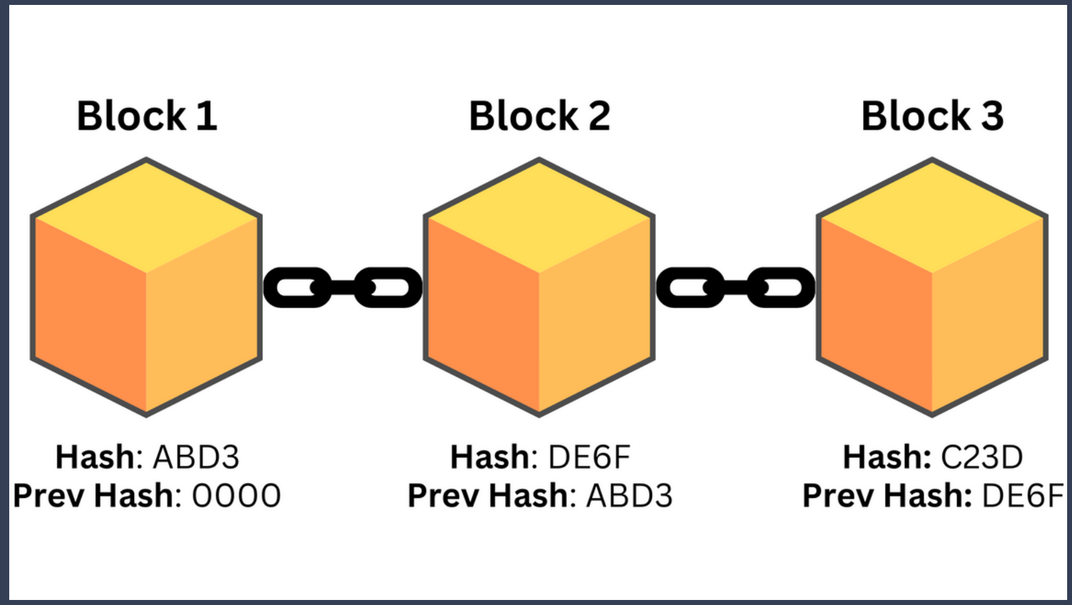
Blockchain

It's a growing list of data blocks that are linked together.

Key features:

- Distributed ledger tech.
- Immutability
- Use of smart contracts
- Resistant against unauthorized

Types: Public, Private, Permissioned, Consortium.



RELATED WORK

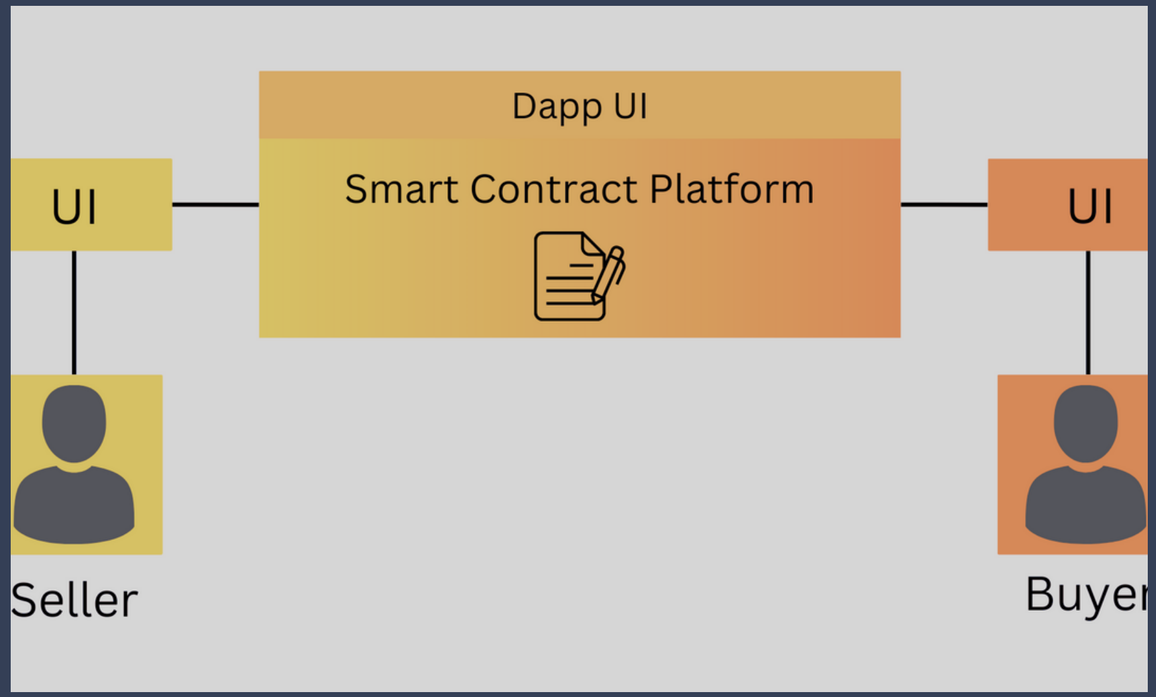
- Mišura and Žagar propose a **centralized model** for an IoT data marketplace.
- Involves registering devices and consumers, saving sensor data in a database, and using a query mechanism to retrieve data.
- The mode offers design issues for IoT data marketplaces.

- Michael and team developed a **decentralized model** with three levels of architecture.
- Smart contracts to ensure compliance with regulations.
- Includes a proxy and brokers.
- The team also analyzed the expenses associated with using smart contracts.

SYSTEM DESIGN

- The proposed system uses blockchain as a reliable third party for enforcing rules and determining data ownership.

- Smart contracts execute the system's functionality, and if the blockchain platform is trustworthy, it facilitates trading.



METHODOLOGY

- Registration
- Sign in
- Uploading the data
- Display the info of the data to participants
- Chatting process
- Trading
- Log out

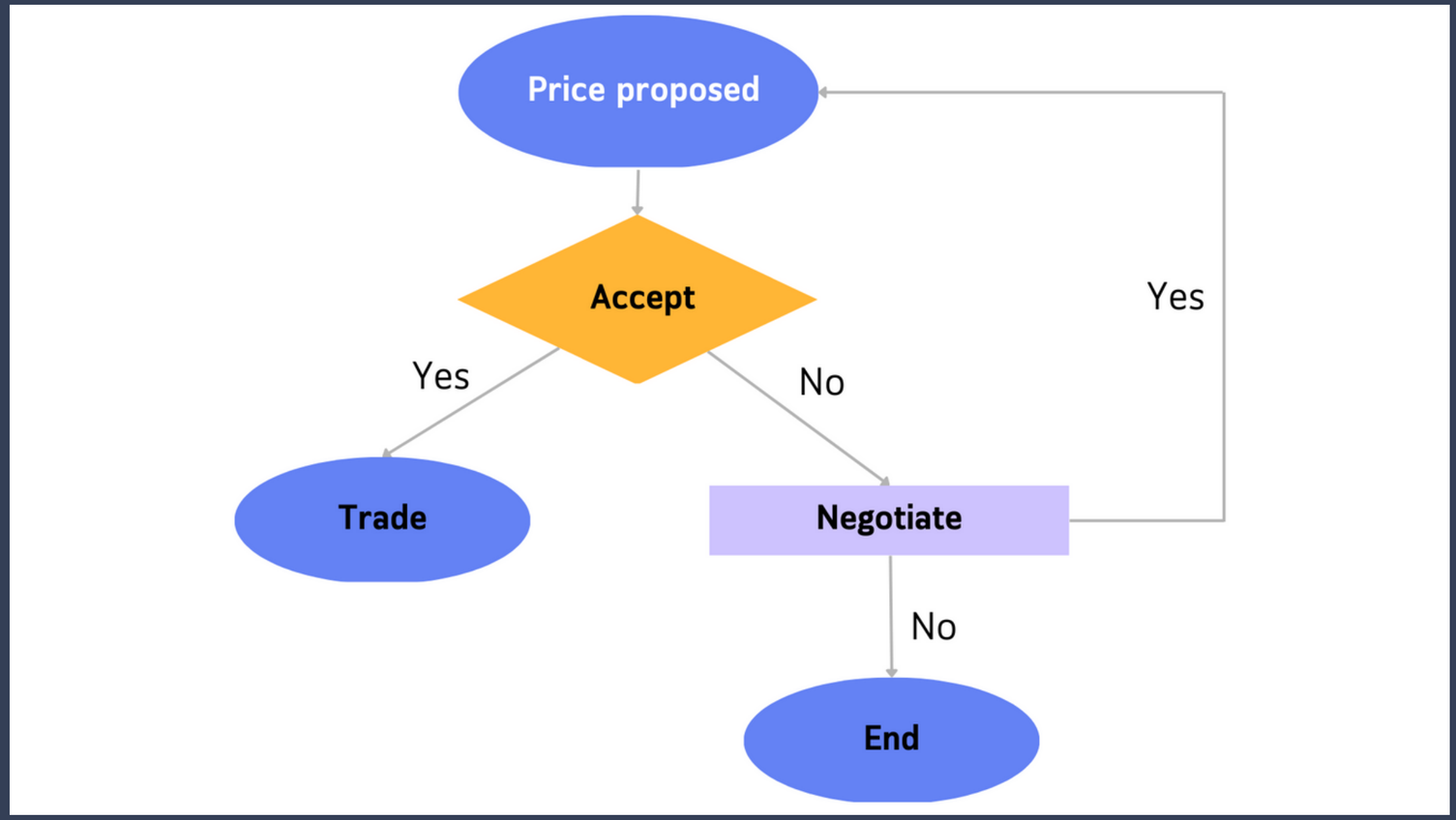

JS
React
Ganache
TRUFFLE
npm
IPFS

IMPLEMENTATION

- Registration
- Sign in
- Uploading the data

- Chatting process
- Trading
- Logout

Bidding process



RESULT

- Cost to deploy: 93.62 USD

```
   --------------------
   > transaction hash:    0x79756e4f26cffebbcddcd50035ef142bebc02bc905b67735f58f626aec38cf29
   > Blocks: 0            Seconds: 0
   > contract address:    0x3672f0248274464f2bb5da5B1dcc1298d33a4F3b
   > block number:        75
   > block timestamp:     1682695958
   > account:             0x4c48f547F3a4c683c4F272F8793caD1838f4F5EC
   > balance:             999998.82434942
   > gas used:            2462994 (0x259512)
   > gas price:           20 gwei
   > value sent:          0 ETH
   > total cost:          0.04925988 ETH

   > Saving artifacts
   -------------------------------------
   > Total cost:          0.04925988 ETH

Summary
=======
> Total deployments:   1
> Final cost:          0.04925988 ETH
```

CONCLUSION

- A proposed data marketplace for IoT data utilizes blockchain technology and smart contracts.
- The platform offers secure and efficient data exchange with transparency, immutability, and decentralization.
- The use of IPFS provides reliable and decentralized storage solution.
- The marketplace enables more efficient decision-making by providing access to valuable and relevant data.

FUTURE WORK

- UI design to show the available items in the marketplace.
- Use advanced analytics and machine learning to extract insights.
- Explore scalability for handling large data volumes.
- Enhance search and filtering capabilities for efficient data retrieval.

REFERENCES

- *Perera.C Georgakopoulos.D, Zaslavsky.A. Sensing-as-a-service and big data. 2012 International Conference on Advances in Cloud Computing, pages 21–29, 2012.*
- *Krešimir Mišura and Mario Žagar. Data marketplace for internet of things. In 2016 International Conference on Smart Systems and Technologies (SST), pages 255–260. IEEE, 2016.*
- *Satoshi Nakamoto. Bitcoin: A peer-to-peer electronic cash system. 2008.*
- *Dinh-Dung Nguyen and Muhammad Imran Ali. Enabling on-demand decentralized iot collectability marketplace using blockchain and crowdsensing. In 2019 Global IoT Summit, pages 1–6. IEEE, 2019.*
- *Michael Sober, Giulia Scaffino, Stefan Schulte, and Salil S. Kanhere. A blockchain-based iot data marketplace. Cluster Computing, 2022.*

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