# A CONCEPTUAL MODEL FOR BLOCKCHAIN-BASED PROJECT INFORMATION SHARING

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# OUTLINE

- Introduction
- Project Data Collection Methods
- Blockchain
- Ideas Behind the Conceptual Model
- Benefits of Blockchain
- Conceptual Model
- Discussion
- Conclusion

# INTRODUCTION

- We make estimations to improve software project planning and management processes.
- Accurate estimations play a significant role in the success of software projects.
- Companies should have sufficient number of past project data to establish software estimation practices accurate and reliable.

# PROJECT DATA COLLECTION METHODS

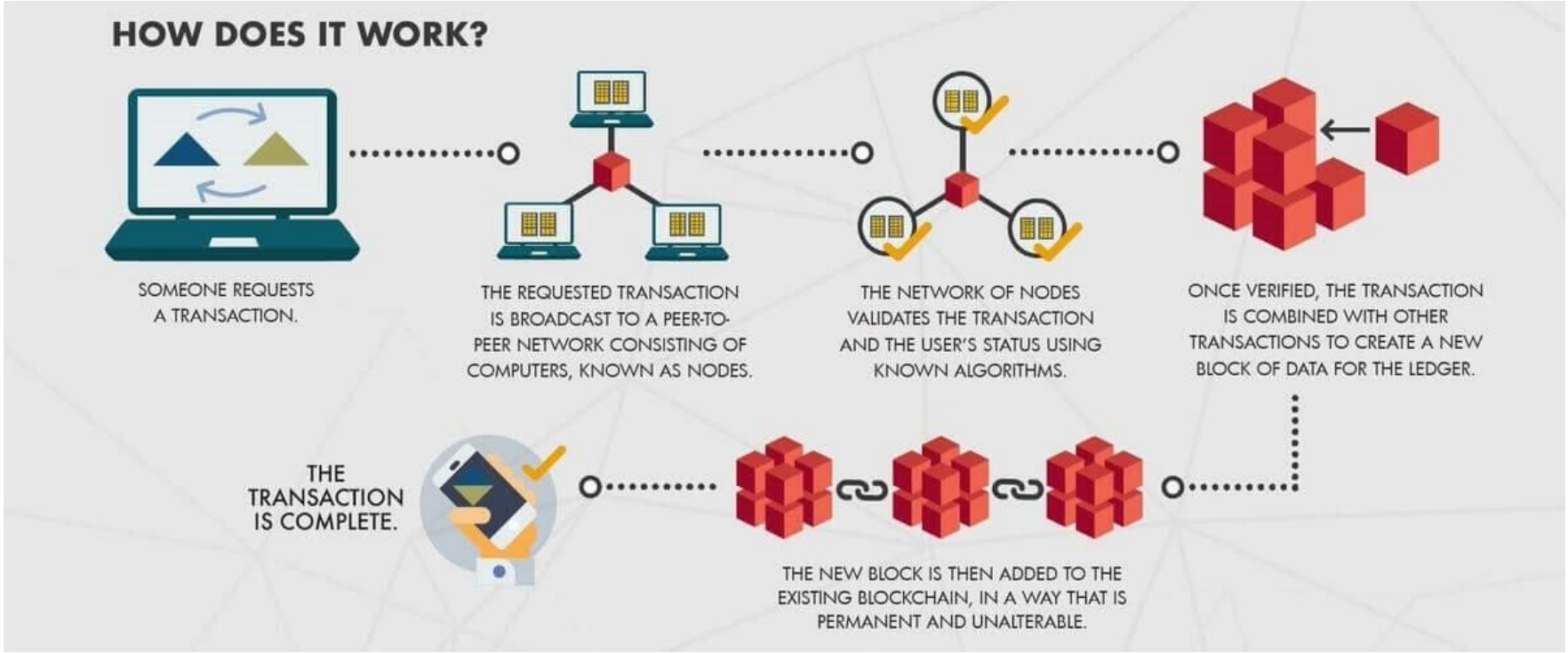
- Within-company dataset from past projects:
  - The company needs time to collect enough data on past projects.
  - The company might have made changes on data for new projects, which could make their previous measurements not usable.
  - All data should be collected and kept consistently.
- Cross-company dataset
  - All users can access to the entire project database.
  - Companies that do not want to share all or part of their project information avoid data entry.
  - Privacy issues prevents the growth of such datasets.

# IDEAS BEHIND THE CONCEPTUAL MODEL

- Stores project information on blockchain.
- Provides attribute-based access control mechanism for stored project information that can be managed by data owner.
- Shares stored project information with access control.
- Provides an incentive mechanism to motivate data owners to share their project information.

# BLOCKCHAIN - I

Blockchain is a distributed database that provides encrypted transaction tracking.



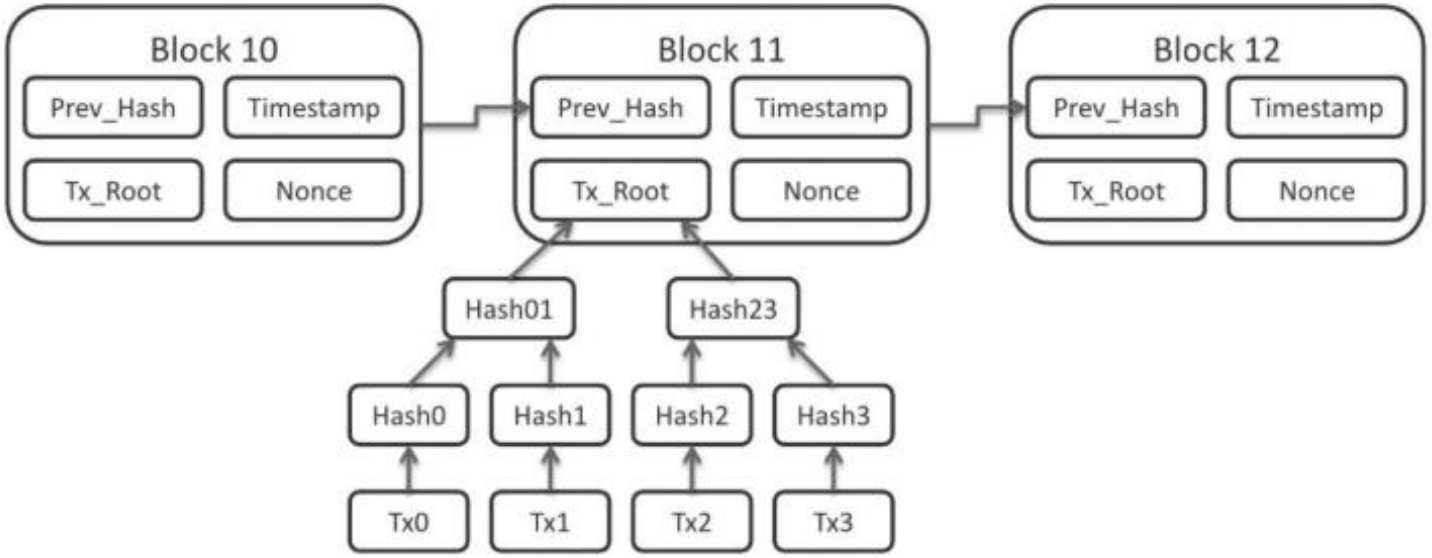
# BLOCKCHAIN - II

Features;

- Immutability
- Decentralization
- Security
- Transparency

Types;

- Public
- Private



# BITCOIN

- Decentralized, open source, p2p cash protocol
- Gold standard of blockchains
- Primary purpose is cryptocurrency
- Transparent transactions
- Primitive scripting language
- Mining process
- Public blockchain

# ETHEREUM

- Ethreum is a decentralized platform designed to run smart contracts.
  - A distributed computer to execute code
  - Turing complete scripting language
- Has a native asset called ether
- Smart contracts: like autonomous agents that live inside of the network
  - Every node executes smart contracts
  - Ethereum virtual machine
  - Every code requires some gas in order to execute
- Mining process
- Public blockchain

# HYPERLEDGER

- Hyperledger is an open source collaborative effort created to advance cross-industry blockchain technologies.
- Permissioned membership
- Confidential transactions
- No built-in cryptocurrency
- No mining
- Chaincode
- Private blockchain

# RELATED USAGES OF BLOCKCHAIN

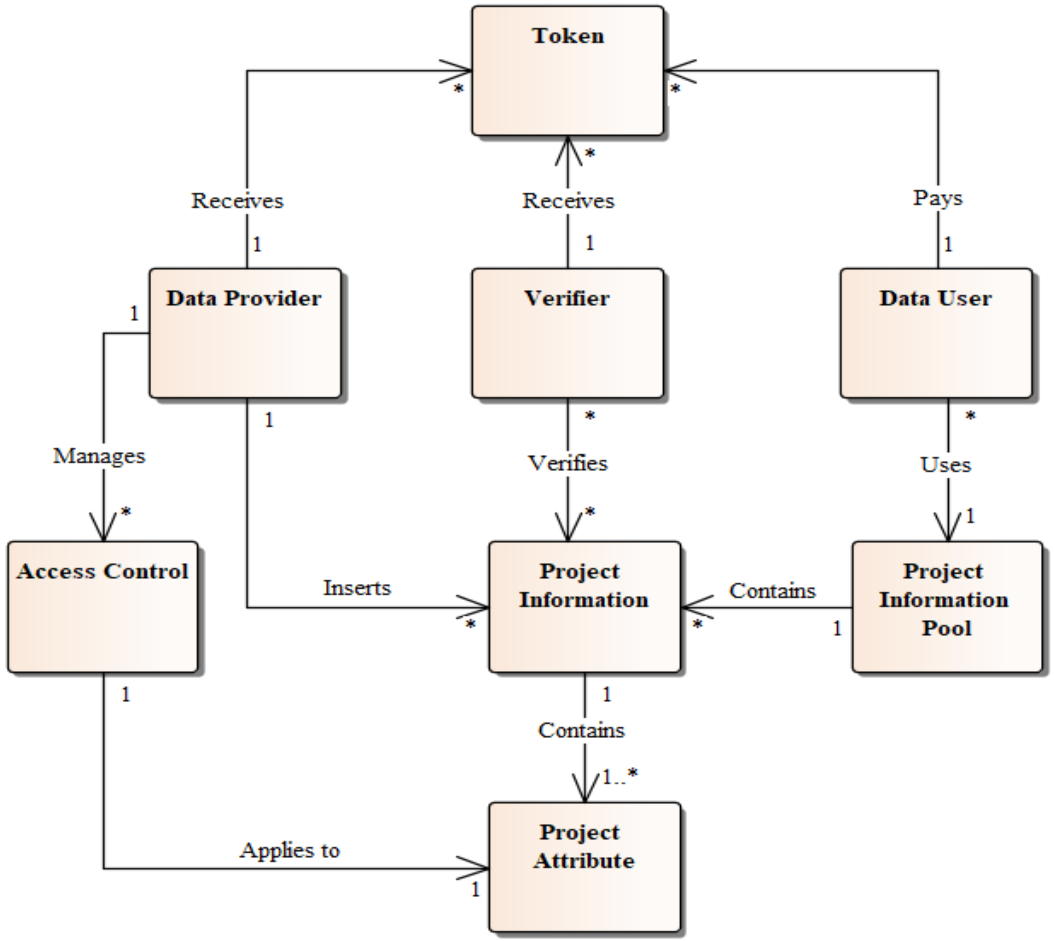
- Access control and authorization mechanisms
  - RBAC-SC: Role-Based Access Control Using Smart Contract (2018)
- Data marketplace
  - IDMoB:  IoT Data Marketplace on Blockchain (2018)
- Medical record management
  - Medrec: Using Blockchain for Medical Data Access and Permission Management (2016)
  - MeDShare: Trust-Less Medical Data Sharing Among Cloud Service Providers via Blockchain (2017)

# BENEFITS OF BLOCKCHAIN

- Decentralization feature and no central authority
  - Access and management controls can be performed only by data provider.
  - Enables the data provider to trust the system.
- Data is stored in a distributed manner
  - There is no risk of losing data.
- Immutable feature
  - Stored information can not be tampered without the consent of the owner.

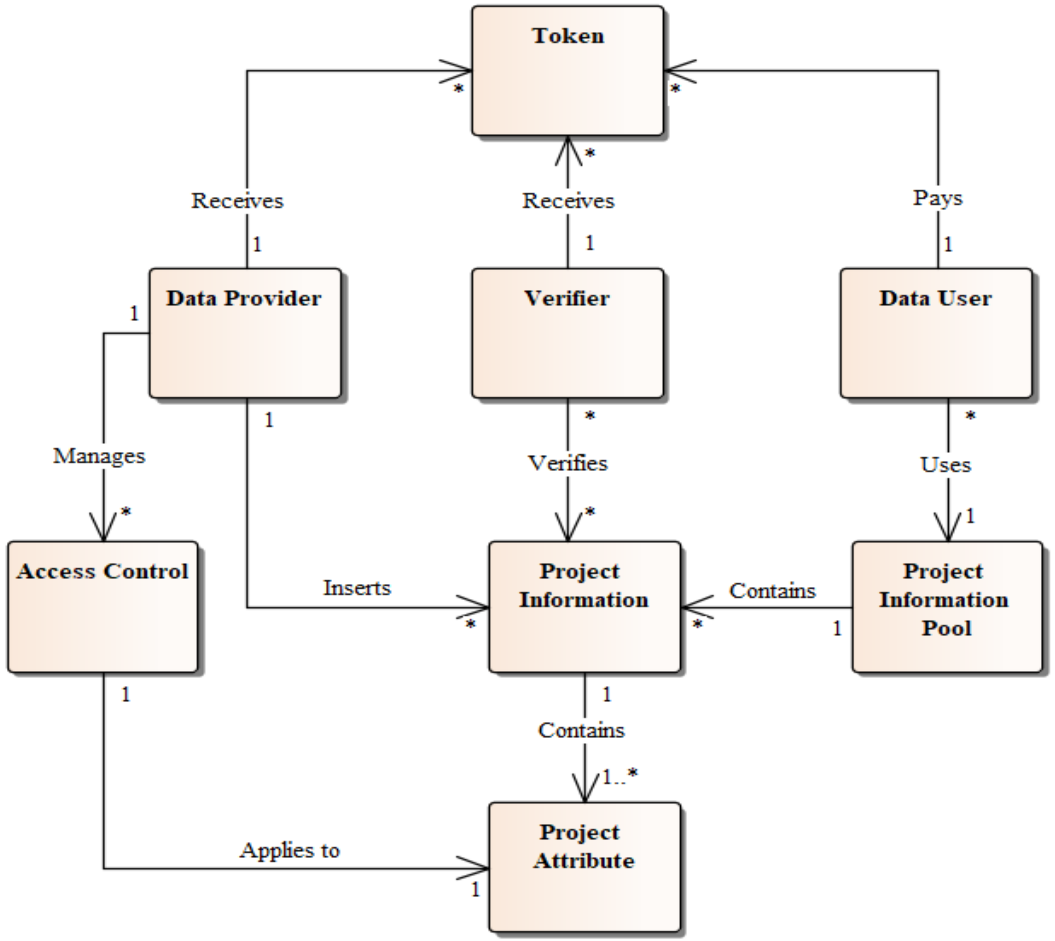
# CONCEPTUAL MODEL – I

- Data Provider
  - Inserts project information
  - Manages access controls
  - Earns tokens
- Verifier
  - Verifies project information
  - Increases rating value
  - Earns tokens
- Data User
  - Queries project information pool
  - Uses project information
  - Pays tokens

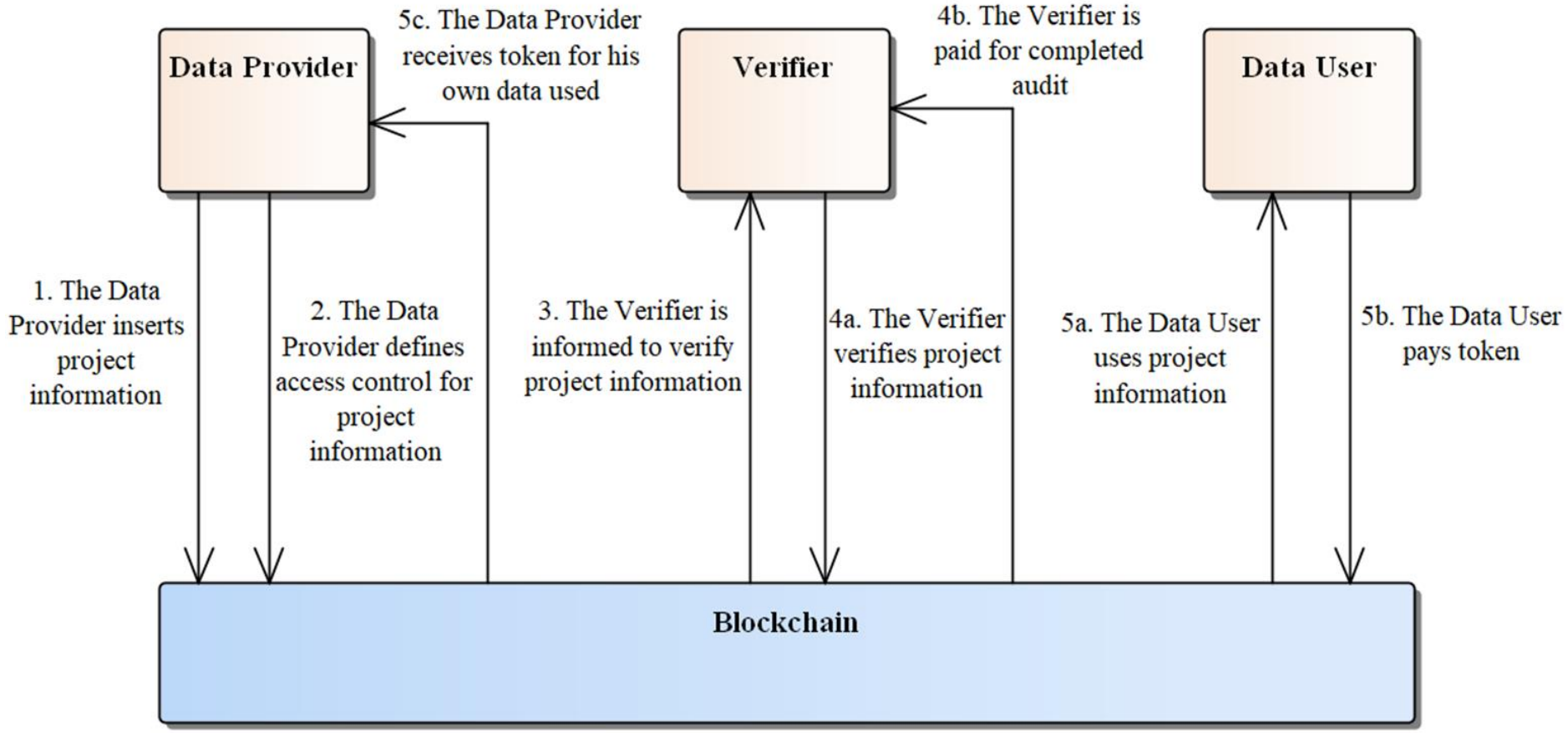


# CONCEPTUAL MODEL - II

- Project Information Pool
  - Collection of all projects' information
- Project Information
  - The data of a software project
- Project Attribute
  - A property of a software project
- Access Control
  - Authorization restriction enabled by data provider
- Token
  - Provides a win-win situation for all roles



# EXAMPLE SCENARIO



# EXAMPLE MAPPING

| Proposed Concept | Sample Dataset (Excel format) |
|---|---|
| Project Attribute | A Cell |
| Project Information | A Row |
| Project Information Pool | All Rows |
| Data User | Customer of Dataset |
| Verifier | Dataset Repository Manager |
| Data Provider | Data Owner of a Row |
| Token | None. Only pain membership for Data User |
| Access Control | Centralized, repository-based |

# DISCUSSION

Currently we are dealing with operational issues of the proposed model.
Then we will address tactical and strategic issues.

We stored some issues to our backlog:

- Malicious user can share displayed data by copying - operational level
- Standard data model is needed for estimation - tactical level

Determining blockchain technology is very critical decision while realizing a system with this model

# FUTURE WORK

- A system will be designed and implemented by using the proposed model.
- An empirical study is planned with a research center in order to evaluate operational principles and validate the usability of the model.

# CONCLUSION

- By defining an access control mechanism we encourage stakeholders for sharing and using project information.
- The features of blockchain technology make the model secure and reliable.
- This model can be adapted for other kind of information storing and sharing problems.

# THANKS FOR LISTENING

- Questions?