UNIVERSITEIT VAN PRETORIA
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# COS730

## SOFTWARE ENGINEERING 1

## ASSIGNMENT 1: CCLEANER

CONTRIBUTORS

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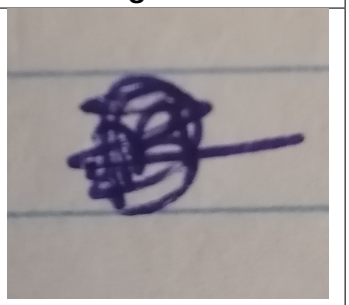
| B.M. Dzimati | 20456078 |  |

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# Introduction

An designed by Stuart Haber and W Scott Stornetta, in 1991 [1], a blockchain is a dispersed ledger or database, which is distributed amongst different computer nodes. It plays a pivotal role in maintaining a decentralized and highly secure record of different transactions that have occurred within a cryptocurrency system[2]. Blockchains aim to keep and integrity of the data within a system, making it unalterable and immutable[1]. Since Bitcoin became mainstream in 2008, the use of blockchain has exploded, being used in a large number of different cryptocurrencies, smart contracts, non-fungible tokens, and decentralized finance systems[2].

# Role Of Cryptography in BlockChain

Blockchain being a peer-to-peer database, it is made up of blocks which are a collection of data and chains being a group(list) of these blocks ”chained” together to form a public database[3]. The groups of blocks are chained together using cryptography(Hashing algorithms are used to generate unique identifies used to link different blocks constructing the chain), highlighting the role of cryptography as being an fundamental, pivotal and essential requirement in building a blockchain[3]. Cryptography is also an important tool in maintaininh the immutability of the data within the blockchain[4].

# Different Types of Blockchains

## 3.1 Public BlockChains:

Public blockchains emphasis decentralization and transparency,they use distributed ledger technology to distribute and store information across a peer-to-peer network. They uses different consensus algorithms to verify the authenticity of the data. These are whereby the involved participants reach a agreement as what the current state of the ledger is. Two common consensus methods are Proof of work and proof of stake. These types of blockchains have no restrictions and are permissionless, anyone with an internet connection can become an authorized node by just signing onto the blockchain platform. Used by cryptocurrencies like bitcoin.

### 3.1.1 Advantages:

- Are completely independent and don’t depend on any organisation to exist as long as people are using the blockchain.
- They are extremely transparent as anyone can access the ledgers recorders

### 3.1.2 Disadvantage:

- They can be slow due to the large number of users as they don’t scale well.
- Are public and highly transparent therefore lack any security or restricitions

## 3.2 Private BlockChains:

Private blockchains are made for restrictive environments like closed networks. This implementation of the blockchain is just like a public blockchain, but it is confined to a set parameter resulting in it being smaller. These are usually confined to a set closed small network, like an organisation or companies. These allow for more control by the organisation, by allowing them to determine who can view, edit or change what. Examples are Ethereum enterprise[5].

#### 3.2.1 Advantages:

- These are faster and transaction process speeds are way faster than public blockchains
- Allow for more security and controlling of the blockchain as a whole

#### 3.2.2 Disadvantage:

- Not just one can audit or confirm the data as they are closed off
- They lacks anonymity and transparency

### 3.3 Hybrid BlockChains:

Hybrid blockchains are used by organisations that want to reap the benfits of both public and private blockchains, by having a closed of permission-based set up of a blockchain while allowing part of it to be completely permission-less and open to the public. Controlling what data is shown public or what permissions can be used on the public information. The information within the private part can be verified by anyone and the organisation who controls the blockchain cannot alter in information. Examples: IBM Hybrid Blockchain[4].

#### 3.3.1 Advantages:

- It protects privacy
- Allows for communication with third parties

#### 3.3.2 Disadvantage:

- Not entirely transparent as information can be hidden.

### 3.4 Consortium blockchains:

These are very similar to hybrid blockchains in their functionality. But they allow more than a single orginsation to work on and manage the distributed network. Thus not just a single entity controls the the blockchain. Used in Hyperledger.[6]

#### 3.4.1 Advantages:

- Is more efficient and secure as compared to public blockchains
- Allows for access control and more security

#### 3.4.2 Disadvantage:

- Not as transparent

## References

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