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Analytical Study of Block Chain Testing and Tools used for Testing

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Abstract: - This paper will explain the technology Blockchain in detail. It is a new concept which is being used in various fields to save information in less time and cost effective. This paper will also explain the types of block chain, advantages, testing strategies and tools used for block chain testing. It is a form of system in which the information or data is stored using blocks where each block has its unique data. The block will have all the information about that particular data.
Keywords: - Block Chain technology, Block chain types, Testing strategies, Testing tools.

Introduction: - In todays era of online data storage, the threat of security is common. If the data is stored online or is centralized than the risk of it getting leaked is common. It is very important to have secure data storing facilities. Now-a-days, the concept of Block chain is in demand and is commonly used in the organization. In block chain the data is stored in blocks form. Each block has its own unique data related to one category of data. Different categories of data is stored in separate blocks. Once the data is stored than it is very difficult to change it. The data stored in this way in the forms of blocks is very difficult to access by unauthorized meaning. Data stored in this way in the form of blocks is very safe and difficult to get leaked.

Block Chain Terminology: - [1]
The Block chain has various components. Following three components are important parts of the block chain: -

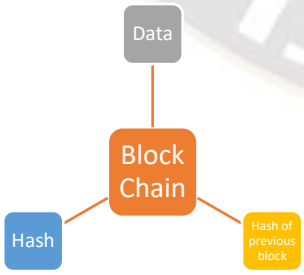

Figure 1 Components of Block Chain

1. Data: - The information is stored in block form. Each block will have its own unique block data. The type of data stored is identified by the type of block. Each block is safe and secure.
2. Hash: - Each block in which the data is stored has a unique Hash. It is like a unique identification given to each block. A Hash is unique to each block. First of all, information is stored in separate blocks and then a unique hash is given to all the blocks. Once a block is made and given hash than any changes made in the blocks will cause the hash to change.
3. Hash of previous block: - Along with hash, each block will have hash of previous block. This is used to make it more secure. Each time the attacker tries to access a particular block than the hash of that particular block changes. In this way the other blocks hashes become invalid as they had the old hashes of the blocks. In this way it can be identified that someone tried to access block.

Types of Block Chain: -

1. Public Block Chain
2. Private Block chain
3. Collective Block Chain

1. Public Block Chain: - This type of block chain is available publicly which means it can be used by everyone out there. Multiple organizations with common type of information can access this type of block chain system.
2. Private Block Chain: - This type of block chain is unique to the organization and can only be used by a particular company. Nobody from outside other than organization members can use this type of block chain.

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3. Collective Block Chain: - This is decentralized block chain which can be accessed by all.

Characteristics of Block Chain: -

a. Enhanced Security: - As discussed, each block has unique hash and hash of previous block, which makes it very easy to identify any attack on the information. Also, the access to these types of blocks is so difficult which increases the security of the data.
b. Capacity: -Data stored in such a way using Block change increases the capacity of the whole system much higher in rate as compared to other data storing methods.
c. Immune nature of data: - Once the data is stored than it is very hard to make changes in these blocks. Hence, there are very less chances that it gets malfunctioned.
d. Faster response: - The use of block chain technology has made it easier to get information faster and hence it reduces time to access information at any point of time. This in turn has increased productivity and efficiency rates with which the companies work.

Block Chain Testing Strategies: -
Following testing strategies are used in Block Chain testing: -

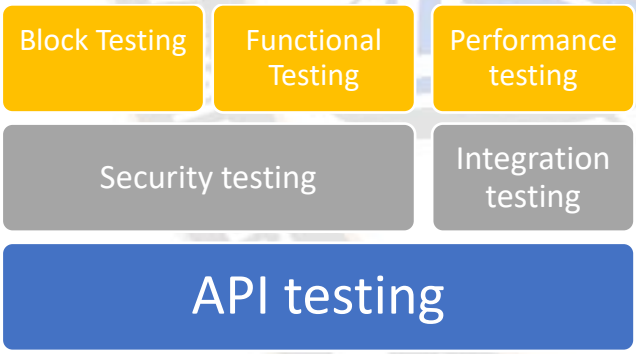

Figure2 Block Chain Testing Strategies

1. Block Testing: - In this testing strategy, each block should be tested separately and also, they should be tested individually over the network for any errors.
2. Functional Testing: - As the name implies, in this type of testing the functioning of each block is tested whether it is working as expected or not. It is tested whether the block is working as expected under different work conditions, with different volume of data etc.
3. Performance Testing: -In this strategy the performance of the block is tested, whether each block is performing same under various work conditions, different platforms, various platforms.
4. Security Testing: - In this testing it is tested what are the threats to the blocks and how it is handling those threat attacks. It is testing whether the blocks which have data is capable of handling the security attacks or not.
5. Integration testing: - In this all the components of block chain are integrated together and then it is checked that the blocks are working correctly without giving any errors.
6. API Testing: - In this strategy it is tested how the blocks are interacting with each other. The performance of interacting with each other is tested in this.

Tools Used for Block Chain testing: - [2]

a. Truffle: - It is a framework which is used to provide Ethereum-based solutions. This tool is basically used to resolve challenges in block chain testing.
b. Parity: - It is one of the popular tools which is used by the developers for management purpose. This is popular for its speedy and reliable services.
c. Block chain Testnet: - This type of tool is used to test block chain in decentralized mode before they work in live environment.
d. Ganache: - This tool is also very popular among the developers and it does not charge for testing the main block chain. It also has many options like built-in block explorer.
e. Mist: - This is also one of the most commonly used tools as it gives Ethereum tokens for performing block chain testing. If the user wants to use it than they should have proper storage for storing them.

Challenges of Block Chain Testing: - [3]

1. Poor block Chain Knowledge: - Lack of skills to implement block chain in an organization is one of the major challenges in the business. The person working on block chain technique should have sound knowledge and have experience to implement it otherwise the organization will face difficulties.
2. Load and Performance: - In block chain sometimes it is difficult to test its performance under various load conditions which in turn will make it insufficient to fulfill business needs.
3. Security: - Due to lack of knowledge, it is seen that the block chain is not able to sustain cyberattacks. It makes it very difficult to make it secure while storing the data and information.
4. Cannot change the data entered: - Once the block chain is implemented and data is stored in it than it is very difficult to make changes in it.

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Conclusion: - Hence this paper has explained the scope of block chain, its various different testing strategy and tools used to perform block chain testing. As the data is stored in each block and hence a unique hash is given to each block which serves the purpose of high-end security and prevents it from unnecessary security attacks.

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