Mini Project

Topic:-Blockchain clock for HFT

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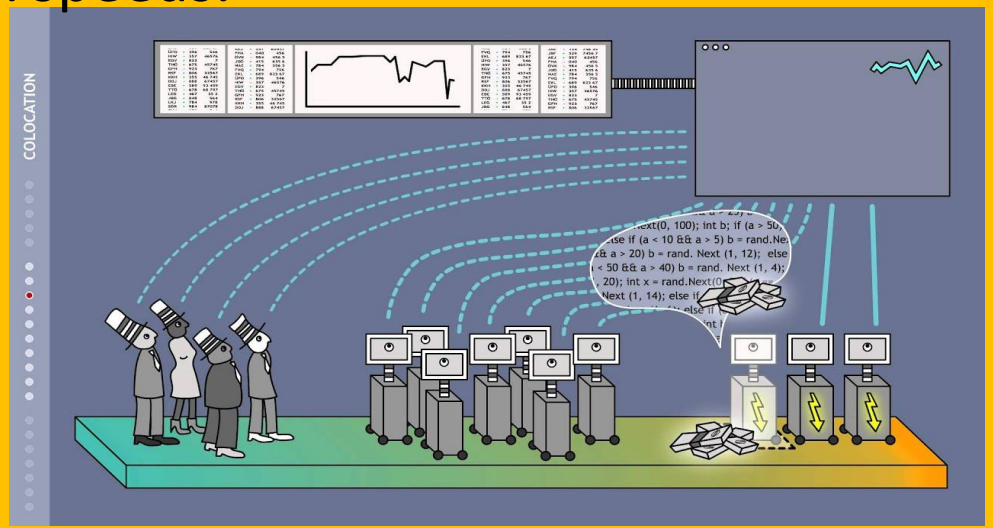
High-Frequency Trading (HFT):

- What Is High-Frequency Trading (HFT)?
- High-frequency trading, also known as HFT, is a method of trading that uses powerful computer programs to transact a large number of orders in fractions of a second.
- It uses complex algorithms to analyze multiple markets and execute orders based on market conditions.
- Typically, the traders with the fastest execution speeds are more profitable than traders with slower execution speeds.



The problem with HFT:

- While there are millions of bots trading everyday, There is always a chance of fraudulent activities such as FRONT RUNNING.

Front running :

- Front-running is trading stock or any other financial asset by a broker who has inside knowledge of a future transaction that is about to affect its price substantially.
  A broker may also front-run based on insider knowledge that their firm is about to issue a buy or sell recommendation to clients that will almost certainly affect the price of an asset.

- This exploitation of information that is not yet public is illegal and unethical in almost all cases. Front-running is also called tailgating.

Blockchain clock for HFT

- To reduce the possibility of fraudulent activity and market manipulation, the
- world's stock exchanges require every clock involved in a stock market
- transaction to be synchronized to agree with a common reference clock that
- keeps accurate and internationally traceable time.

- The type of front running we deal with:

- Front running is of different types.

- Due to unsynchronized clocks, time stamps for stock trades vary by microseconds and intentional or unintentional front running takes place.

- For example, if a person wishes to buy a stock of price $10(at 4:00:01:100 PM) on a stock exchange for instance NYC stock exchange,
- He bids the buying amount of $10.25(At 4:00:01:200 PM) as the price keeps increasing but this person will not be able to buy the stock because the bots performing the trades will for instance purchase stock for $10.30 on the exchange, and instantly sell it for $10.45 increasing the price of the stock.
- Hence the former user loses some money on the stock and will remain in loss.
- This activity can either be unintentional as bots were designed to do the regular HFT or maybe intentional where Bots were designed specifically to "front run" someone in the market.

The solution proposed by NIST-UTC:-

- NIST disciplined clocks (NISTDC) provide UTC(NIST)
- synchronization to numerous stock market locations
- A NISTDC is a rack mount instrument (PC-based) that is co-located in the same data center as the
- computers that record stock exchange transactions.
- All NISTDCs are calibrated at NIST prior to shipment to compensate for cable and hardware delays.
- NISTDC units currently synchronize some of the world's largest stock exchanges and are installed
- at data centers near New York City and Chicago in the US, as well as in London and Frankfurt in the
- EU, and in Tokyo, Japan.

Can markets trust the NIST clock?

- The answer is YES and NO,
- Most of the stock exchanges are already synched with the NIST clock, and they rely upon the clock for time stamping.
- What if the clock runs into a cyber attack and the clock will be manipulated by the attackers to again cause front running?
- The solution is BLOCKCHAIN.

- We can use a virtual blockchain based clock which runs as a smart contract on the blockchain network which will provide time stamping for the exchanges.
- This is a huge addition to the security of the trading as manipulating blockchain network is beyond impossible.

How it works?

- Whenever the exchanges have to time stamp the transactions done by either the broker or the user, they can retrieve the current time from the smart-contract which behaves as a CLOCK.
- Thereby All the clocks of the market will be in sync with the clock.

How does it prevent FRONT-RUNNING?

- Blockchain networks can never be manipulated .
- The clocks of the market are always in sync with this blockchain clock,
- For each and every transaction that takes place, we retrieve time data such as time-zone, current time, location from the blockchain network and stamp it into our transactions,
- If anyone tries to manipulate the time, will be detected by the network and the transaction will be made invalid.

THANK YOU