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DIGITAL ASSIGNMENT 2
VIBES: Fast Blockchain Simulations for Large-scale Peer-to-Peer Networks

BLOCKCHAIN SIMULATOR GROUP-3

VIBES (Virtual Blockchain Simulation Environment) is a fast and scalable simulator for large-scale peer-to-peer networks running blockchain protocols. It is designed to provide a realistic and controllable environment for testing and evaluating blockchain systems.

VIBES uses a discrete event simulation approach to model the behavior of nodes in a blockchain network. It includes a set of pre-built blockchain protocols, including Bitcoin and Ethereum, and allows users to customize and create their own protocols.

The simulator is designed to be highly scalable, capable of simulating networks with millions of nodes. It also features a fast and efficient implementation, allowing for quick experimentation and testing of different scenarios.

One of the unique features of VIBES is its ability to simulate network latency and packet loss, providing a more realistic testing environment for blockchain protocols. It also includes a visualization tool that allows users to see the behavior of nodes and transactions in the network.

Overall, VIBES is a powerful tool for researchers and developers working on blockchain systems, providing a fast and scalable simulation environment for testing and evaluating new protocols and applications.

It offers several advantages, including:

1. High scalability: VIBES can simulate large-scale blockchain networks with thousands of nodes and transactions, making it an ideal tool for testing and optimizing blockchain protocols.

2. Realistic simulation: VIBES simulates the behavior of nodes in a blockchain network, including message propagation, consensus protocols, and transaction validation. This provides a realistic view of how the network will function in the real world.

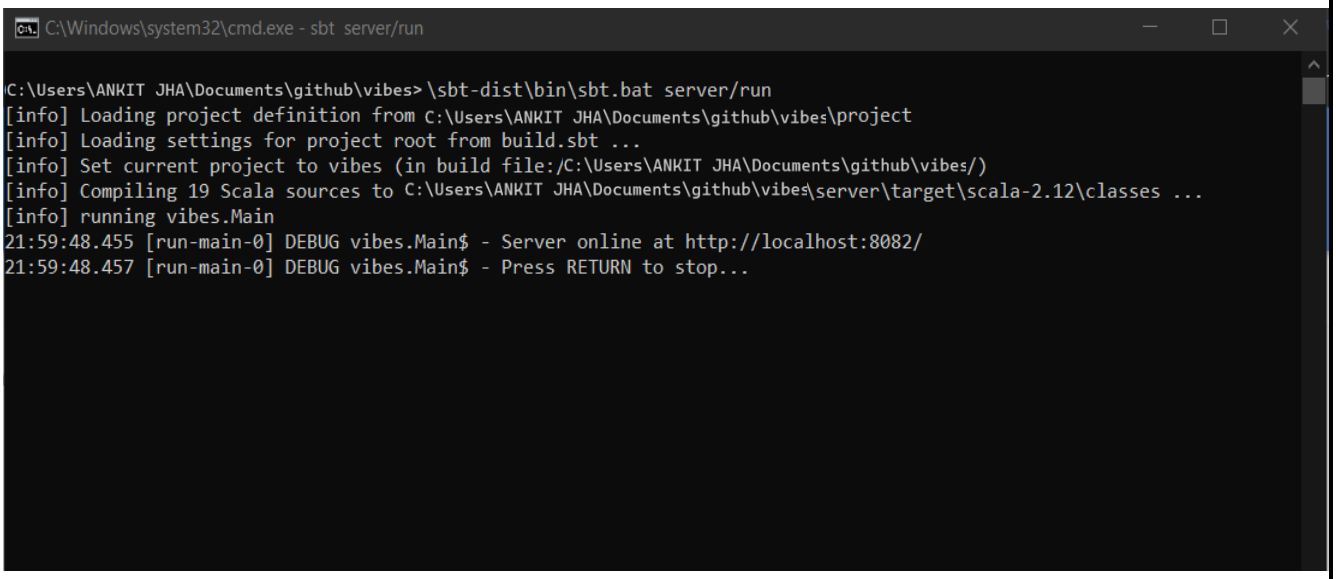
3. Fast simulation: VIBES is designed to be fast and efficient, allowing users to run simulations quickly and easily.

4. Customizable parameters: VIBES allows users to customize various parameters, such as network topology, transaction rate, and block size, to test different scenarios and optimize blockchain protocols.

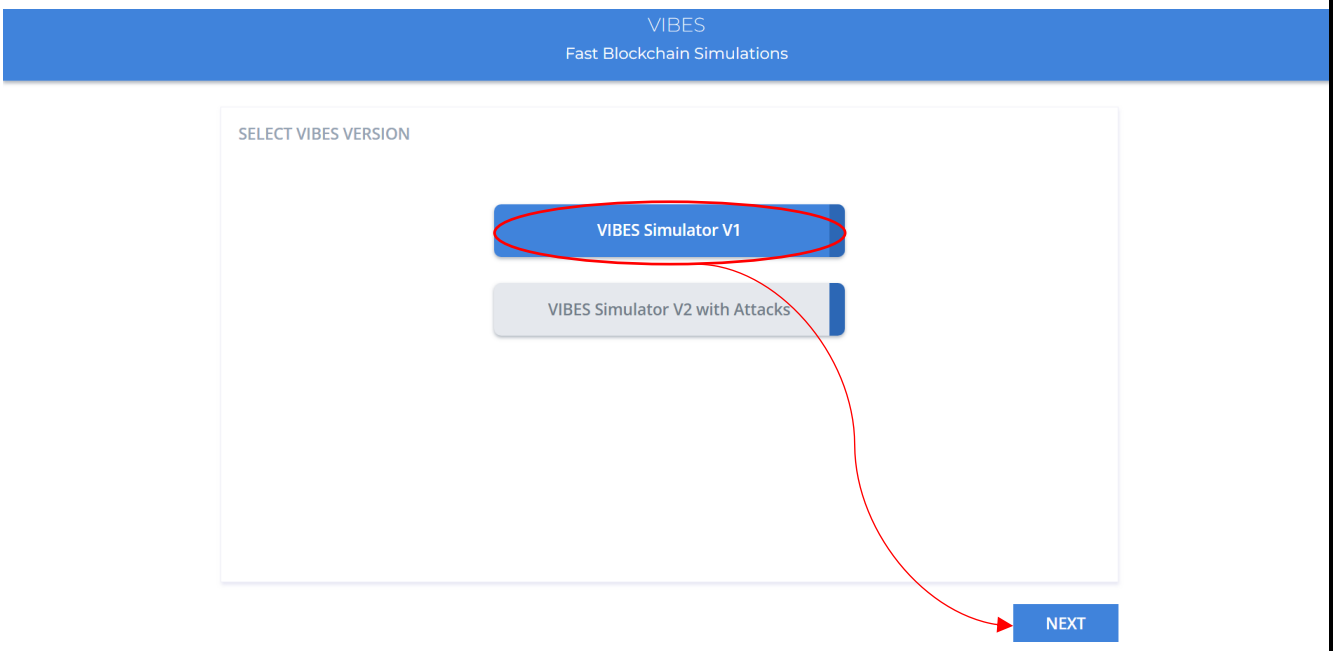
- Download vibes blockchain simulator from their github repository.

- The only thing you need to install is SBT (interactive scala build tool) as documented from https://www.scala-sbt.org/
- You need to install the npm package manager as documented: https://www.npmjs.com/
- After the installation is done, you can navigate to the frontend folder of the project and run yarn install.

- Navigate to the root folder and run start frontend and backend.bat to start the frontend and backend server. Go to http://localhost:8080/ with your browser.

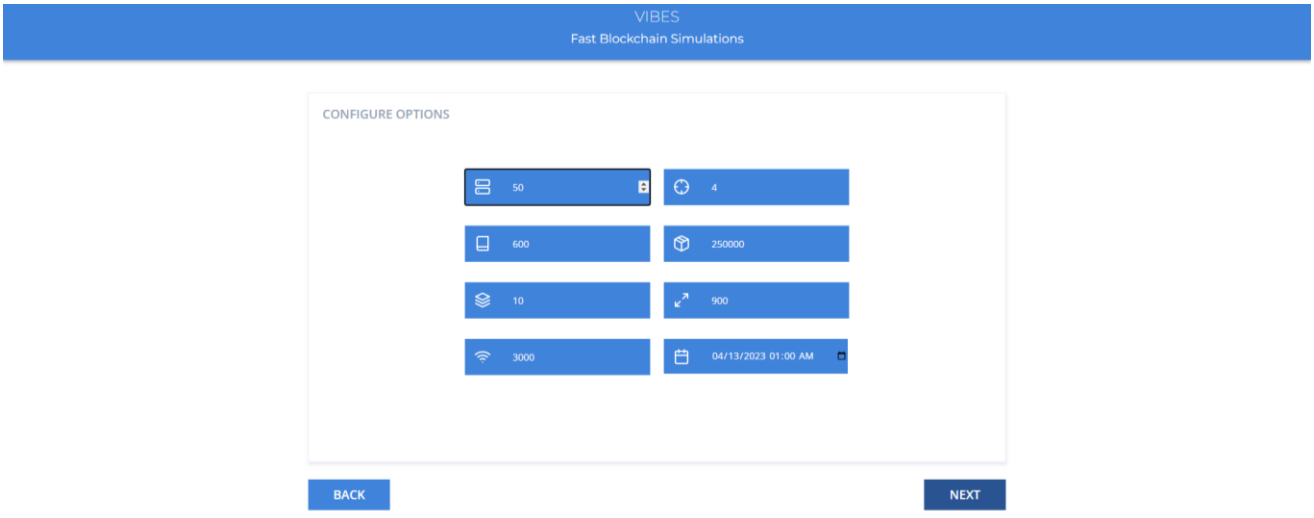


There are two options to operate in. One can go for the traditional simple blockchain simulator or the V2 which also includes various attack simulation

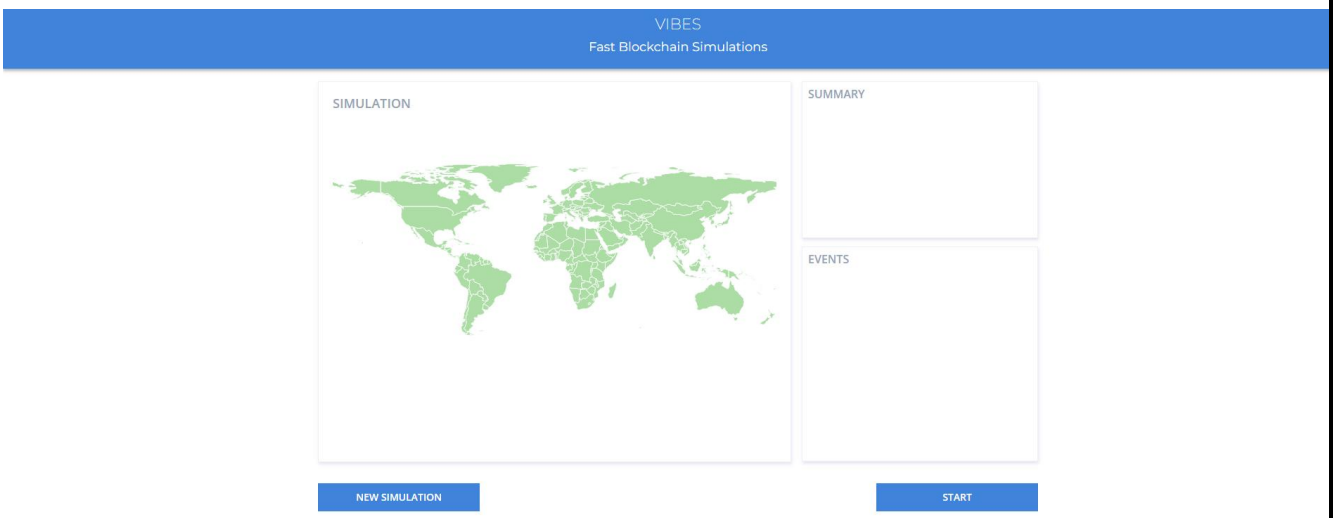


Simulator V1

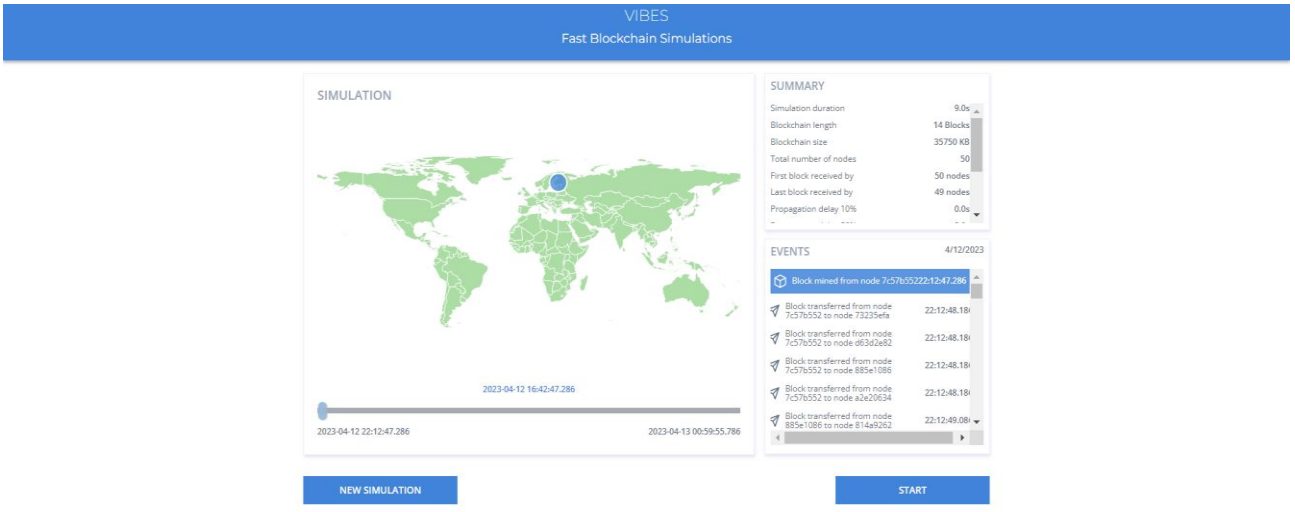
We are given the option to configure the blockchain network for the desired simulation run.



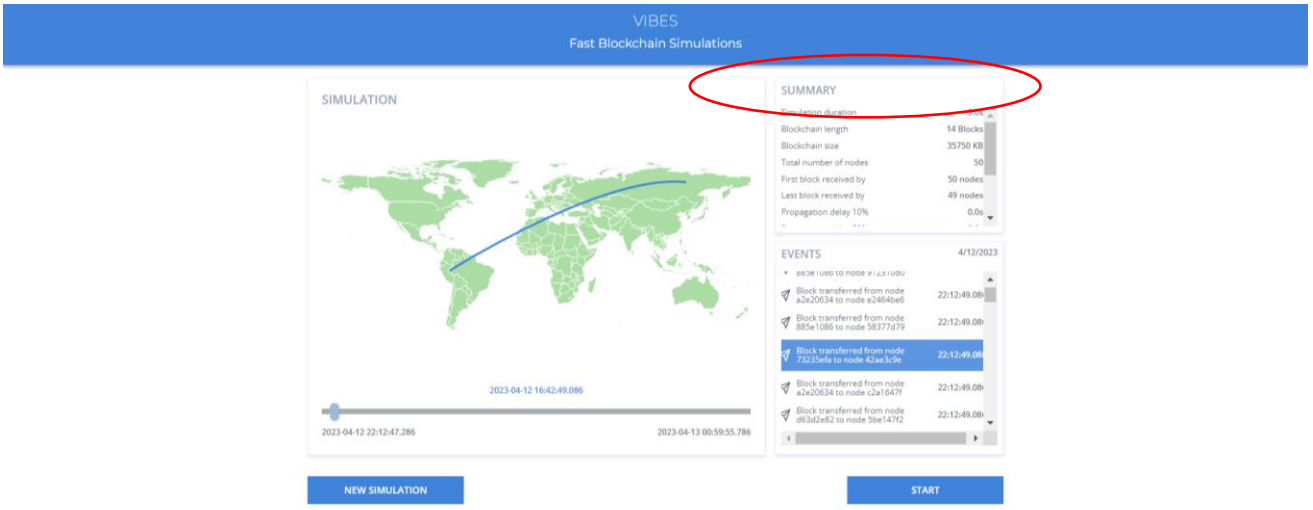
Once we move to the next screen, we are able to observe the GUI for simulation.



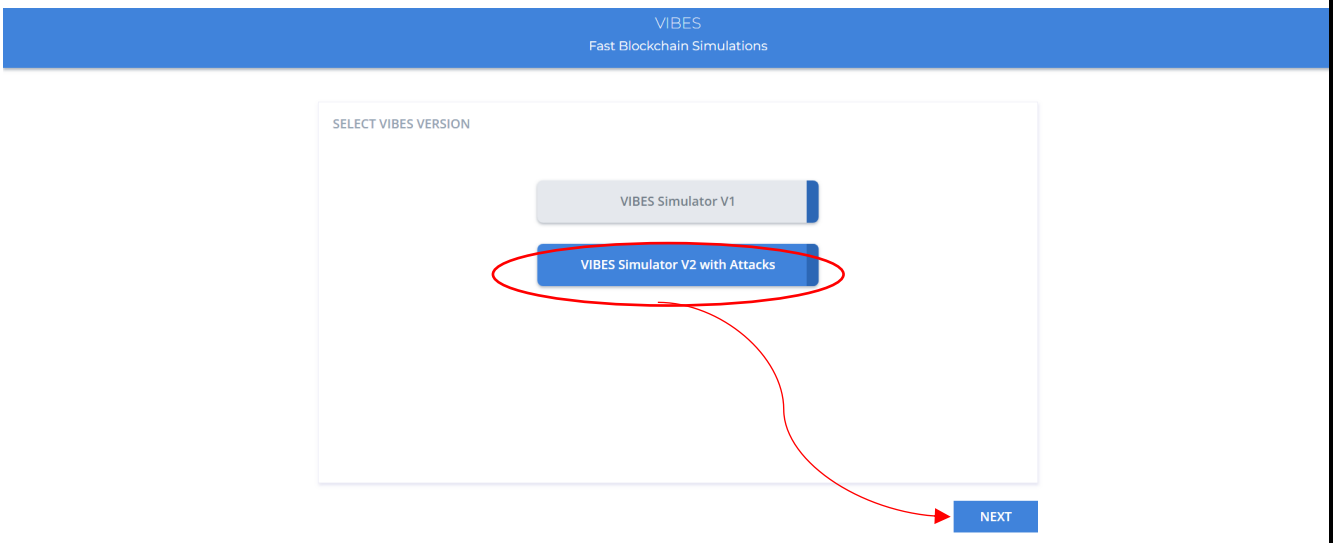
Once we start the simulation, the blockchain network will evolve and the transactions will proceed to happen.



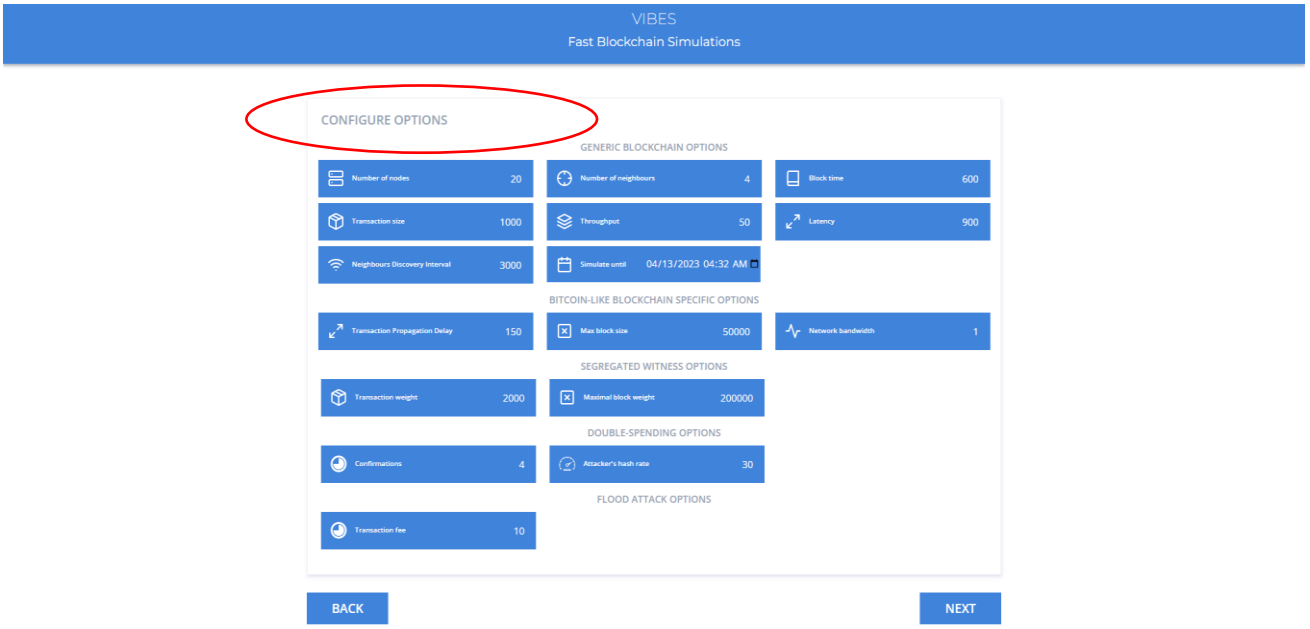
We are able to observe each transaction's details in the summary sub-window and the graphical representation of receiver and sender in the GUI



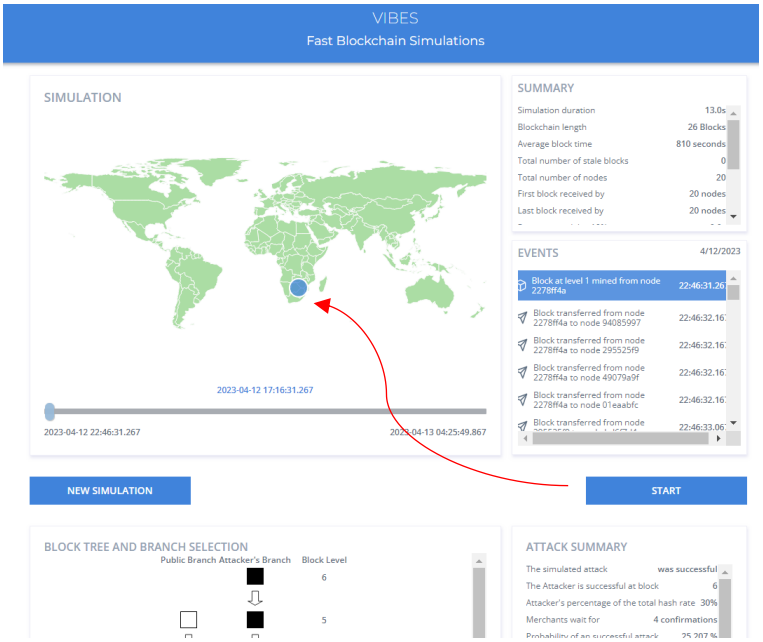
Simulator V2 with attacks

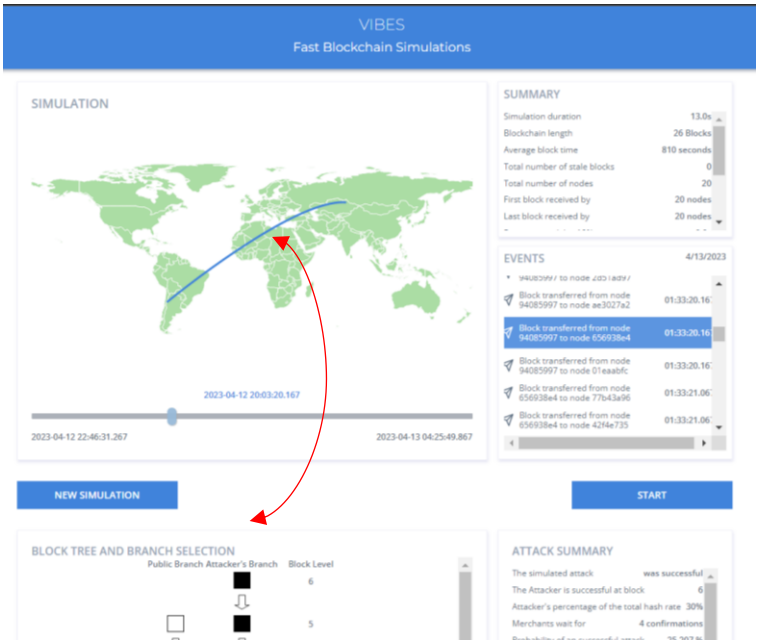


We are given the option to configure the blockchain network, and other attack parameters for the desired simulation run.

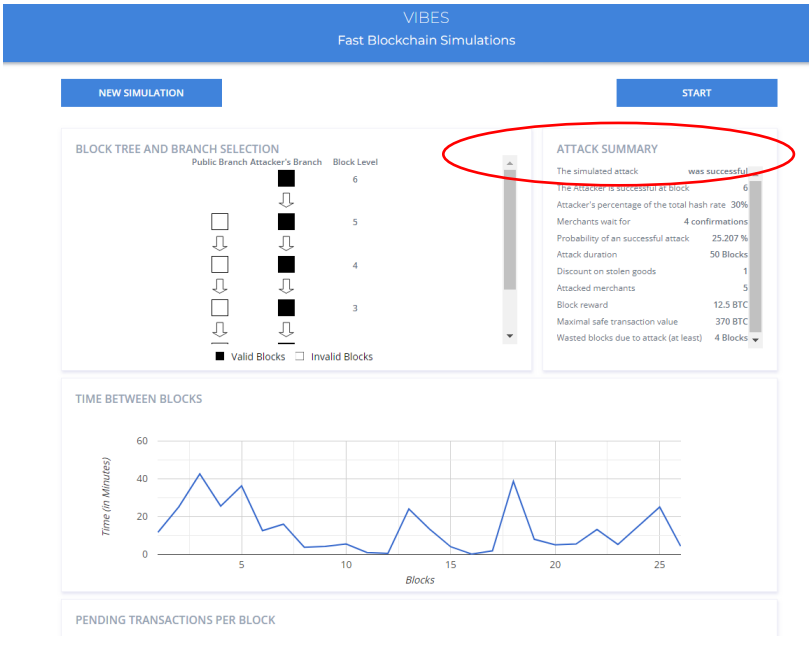


Once we start the simulation, the blockchain network will evolve and the transactions will proceed to happen.





We can see the details about all the attack simulations and further information and statistics about the network




VIBES
Fast Blockchain Simulations
PENDING TRANSACTIONS PER BLOCK
Pending Transactions
Blocks
PROCESSED TRANSACTIONS PER BLOCK
Processed Transactions
Blocks
Processed Transactions
Maximum Possible Transactions
TRANSACTION SUMMARY
SegWit is enabled
SegWit theoretical block weight limit 200,000 B
SegWit maximal block weight 100,000 B
Non-SegWit maximal block size 50,000 B
Average block size 55,731 B
SegWit maximal transactions per block 100
Non-SegWit maximal transactions per block 50
SegWit maximal transactions per second 0.167
Ion-SegWit maximal transactions per second 0.08
Average transactions per second 0.068
Blockchain size 1449 KB
TRANSACTION CONFIRMATION STATUS PER TRANSACTION FEE


VIBES
Fast Blockchain Simulations
Processed Transactions
Maximum Possible Transactions
Non-SegWit maximal transactions per block 50
SegWit maximal transactions per second 0.167
Ion-SegWit maximal transactions per second 0.08
Average transactions per second 0.068
Blockchain size 1449 KB
TRANSACTION CONFIRMATION STATUS PER TRANSACTION FEE
Transactions
Transaction Fees (in Satoshi)
Confirmed Transactions
Unconfirmed Transactions
AVERAGE TRANSACTION CONFIRMATION TIME PER TRANSACTION FEE
Confirmation Time (in Blocks)
Transaction Fees (in Satoshi)