K. J. Somaiya College of Engineering, Mumbai-77
Department of Computer Engineering

Batch: Batch-1	**Roll No.: 1811008**
Experiment / assignment / tutorial No. 01	
Grade: AA / AB / BB / BC / CC / CD /DD	
Signature of the Staff In-charge with date	

Title: Block chain demo - Link-1 Link-2
Block explorer – Bitcoin and Ethereum and Test Networks

Objective:

To explore the blocks of chains, hashing process, peer to peer distribution and transaction data storage. To also explore the Block Explorer to see newly mined blocks and their contents and observe how the chain of process works.

Expected Outcome of Experiment:

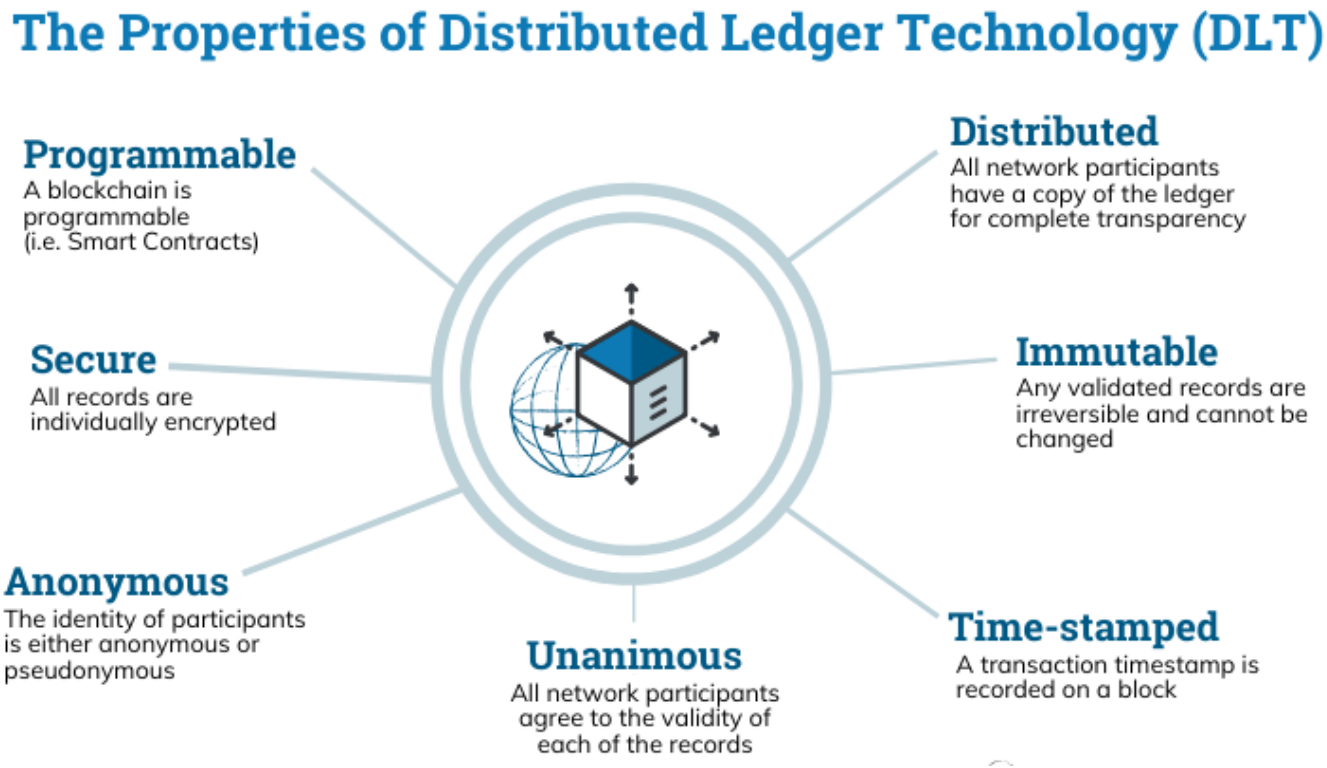
CO	Outcome
CO1	Build your own Blockchain businesses with acquired knowledge

Books/ Journals/ Websites referred:

1. Introduction to Blockchain technology | Set 1 - GeeksforGeeks
2. Blockchain Explorer - Search the Blockchain | BTC | ETH | BCH
3. Blockchain Demo (andersbrownworth.com)
4. Blockchain Demo - A visual demo of blockchain technology

Abstract:-

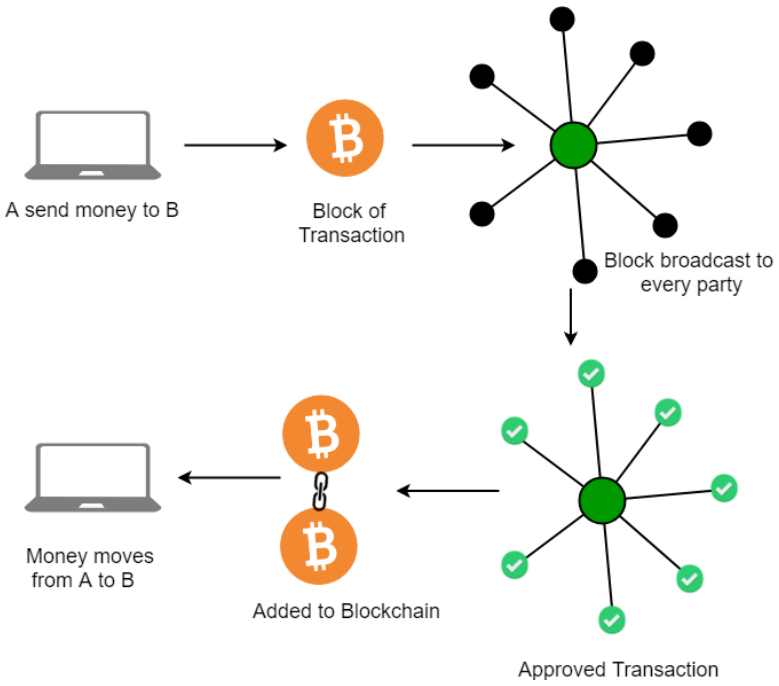
Blockchain is the backbone Technology of Digital CryptoCurrency BitCoin. The blockchain is a distributed database of records of all transactions or digital event that have been executed and shared among participating parties. Each transaction verified by the majority of participants of the system. It contains every single record of each transaction. BitCoin is the most popular cryptocurrency an example of the blockchain. Blockchain Technology first came to light when a person or Group of individuals name 'Satoshi Nakamoto' published a white paper on "BitCoin: A peer to peer electronic cash system" in 2008. Blockchain Technology Records Transaction in Digital Ledger which is distributed over the Network thus making it incorruptible. Anything of value like Land Assets, Cars, etc. can be recorded on Blockchain as a Transaction.



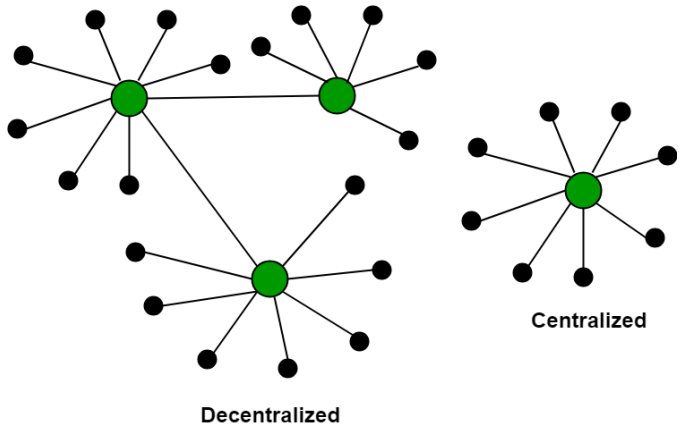
Related Theory: -

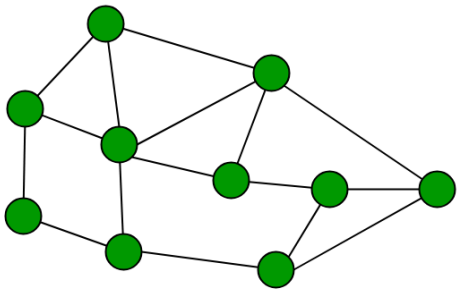
How Blockchain Technology works?

One of the famous use of Blockchain is Bitcoin. The bitcoin is a cryptocurrency and is used to exchange digital assets online. Bitcoin uses cryptographic proof instead of third-party trust for two parties to execute transactions over the internet. Each transaction protects through digital signature.

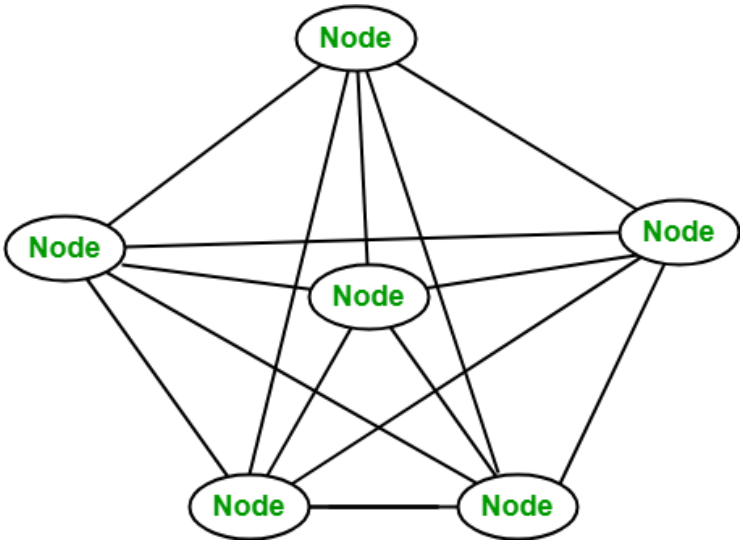


Distributed Database: There is no Central Server or System which keeps the data of Blockchain. The data is distributed over Millions of Computers around the world which are connected with the Blockchain. This system allows Notarization of Data as it is present on every Node and is publicly verifiable.





A network of nodes: A node is a computer connected to the Blockchain Network. Node gets connected with Blockchain using the client. Client helps in validating and propagates transaction on to the Blockchain. When a computer connects to the Blockchain, a copy of the Blockchain data gets downloaded into the system and the node comes in sync with the latest block of data on Blockchain. The Node connected to the Blockchain which helps in the execution of a Transaction in return for an incentive is called Miners.

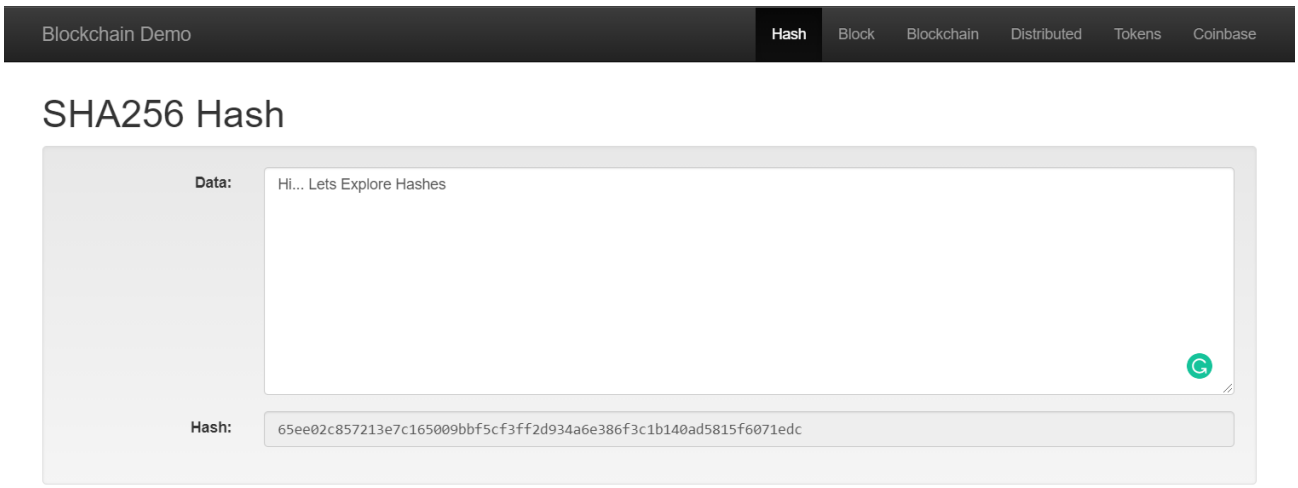


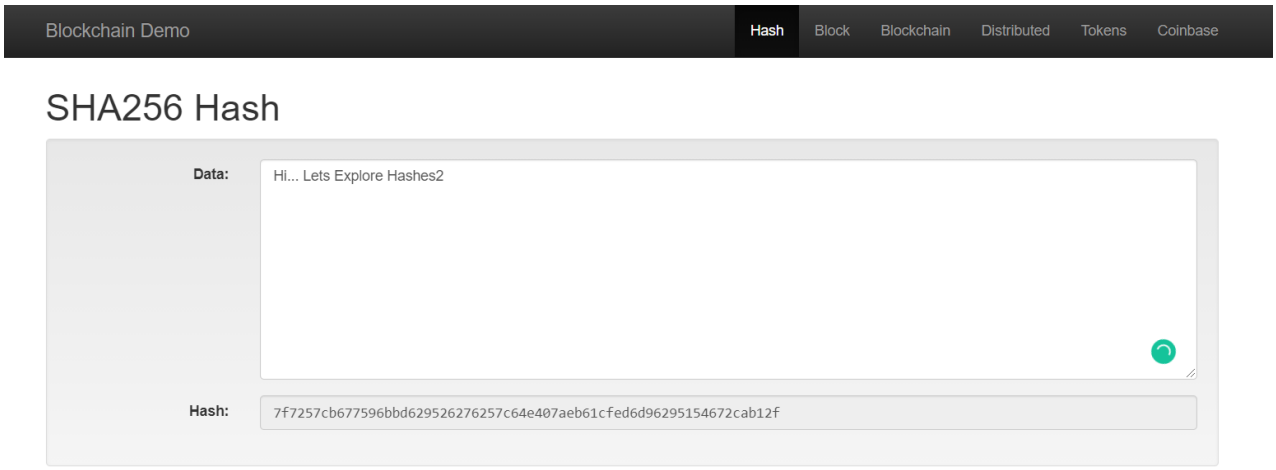
Implementation Details:

1. Enlist all the Steps followed and various options explored

ANSWER:

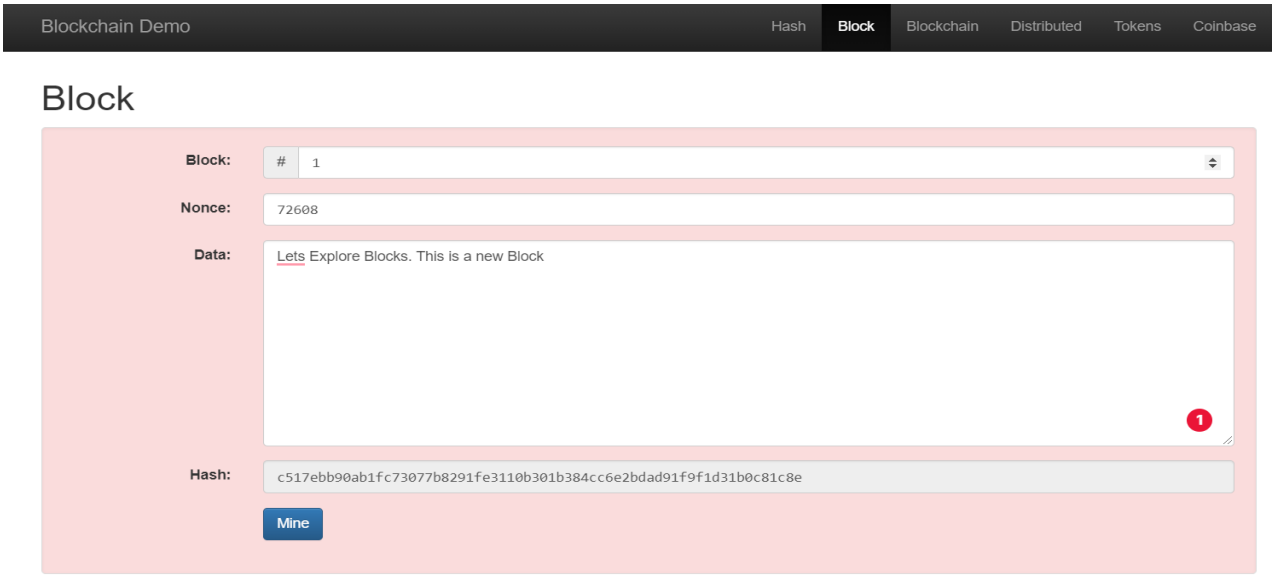
1. Exploring the Hashing methodology of a block in blockchain.



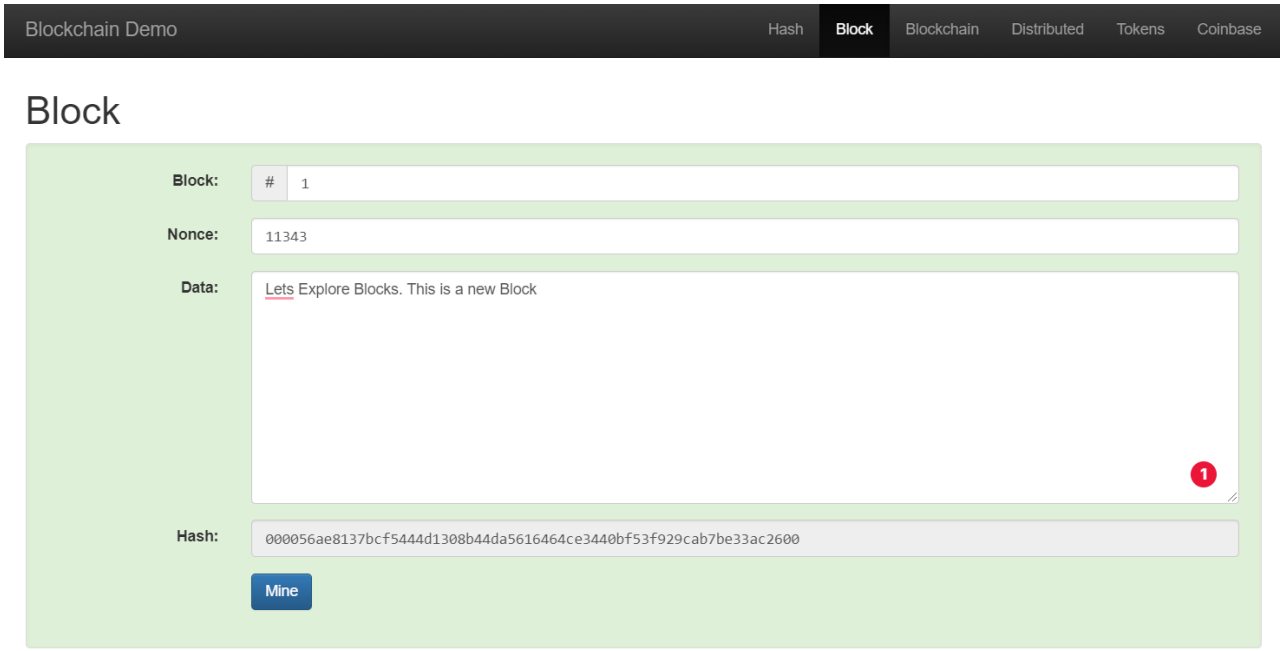


2. Observing the hash value for a block when mined using nonce and data. Also changing the data to see what happens to the block.

a. Before Mining the Block and changing the empty data:

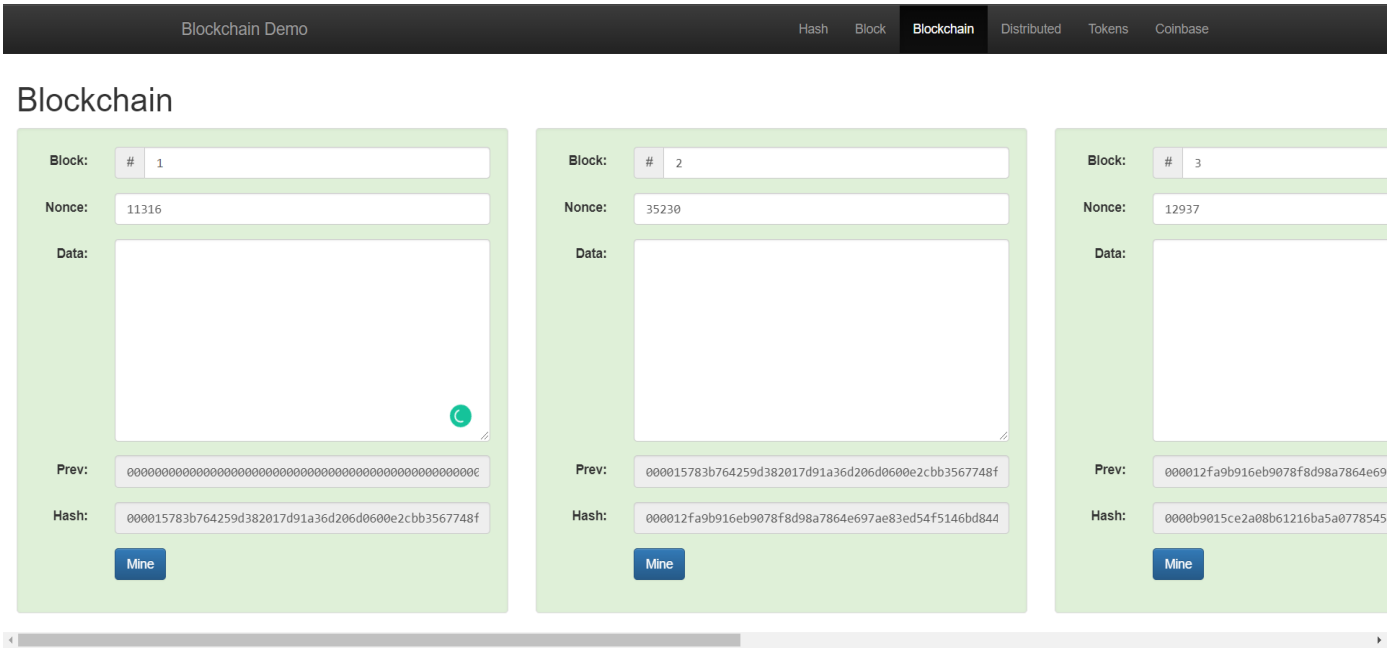


b. After Mining the Block:

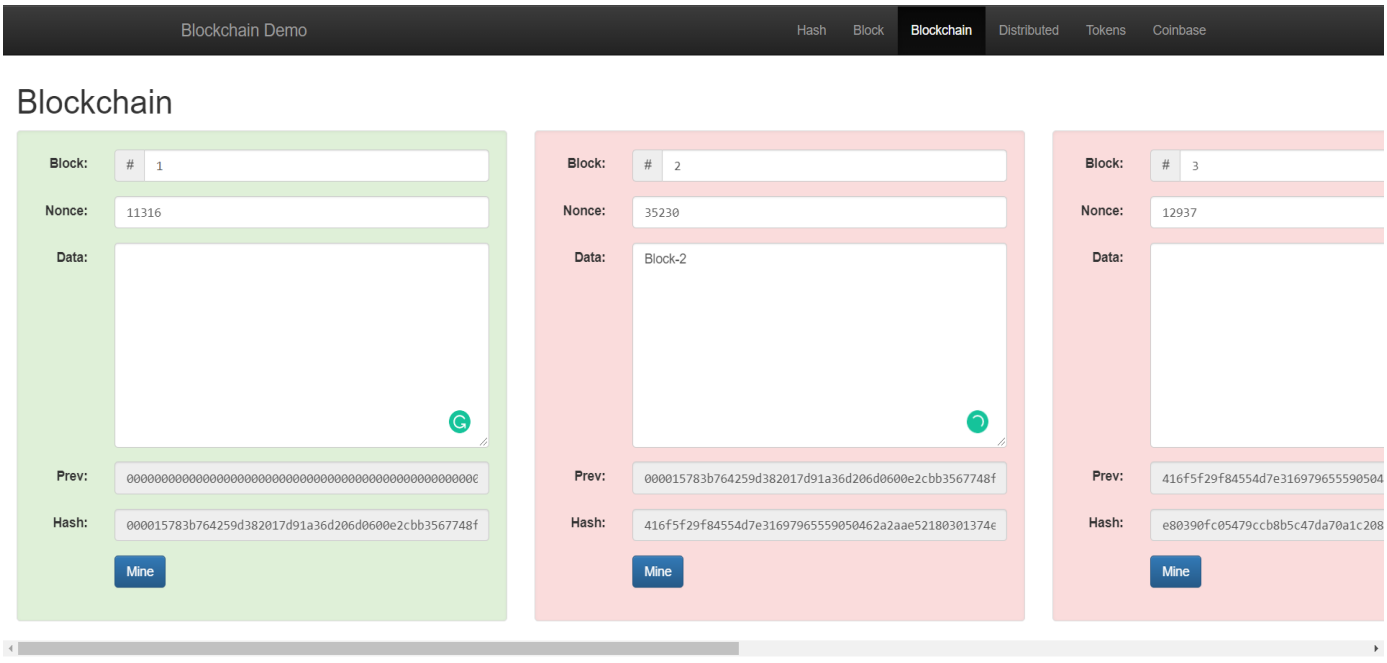


3. Observing the chain of Blocks place one after other to see what happens when data of one block changes in the system.

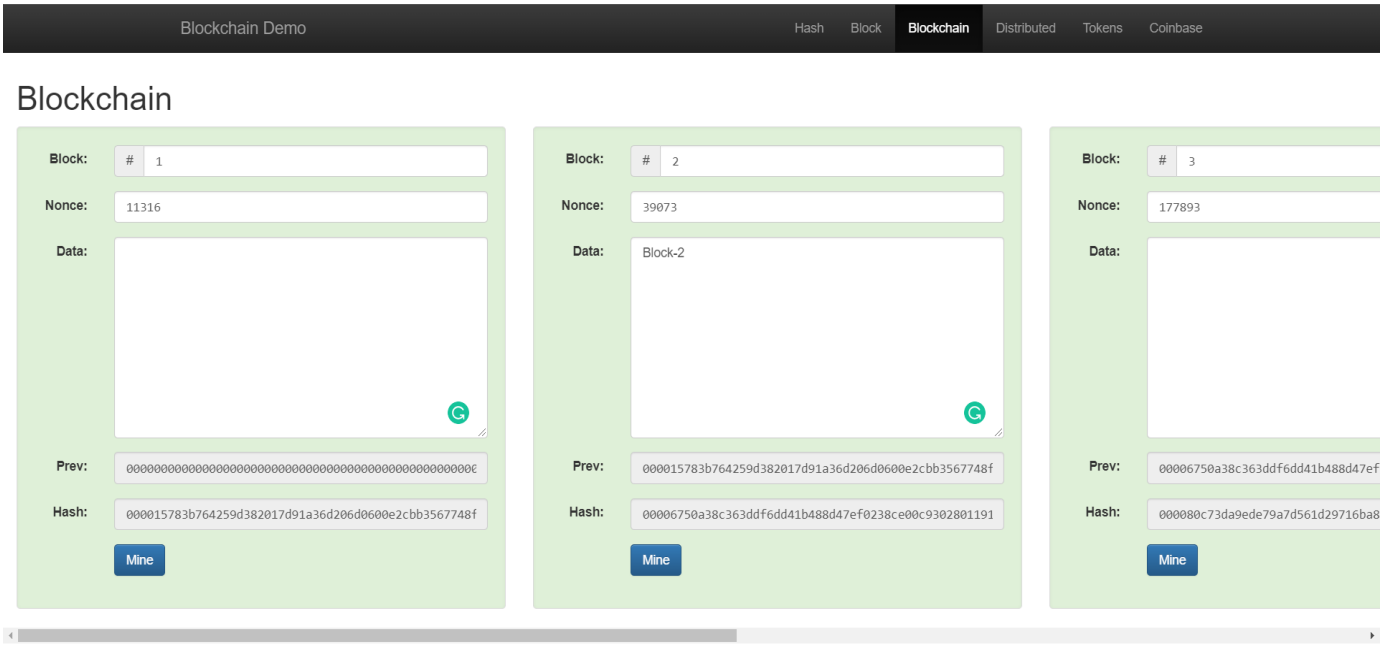
a. Initial State:



b. Changing the Data in Block-2:

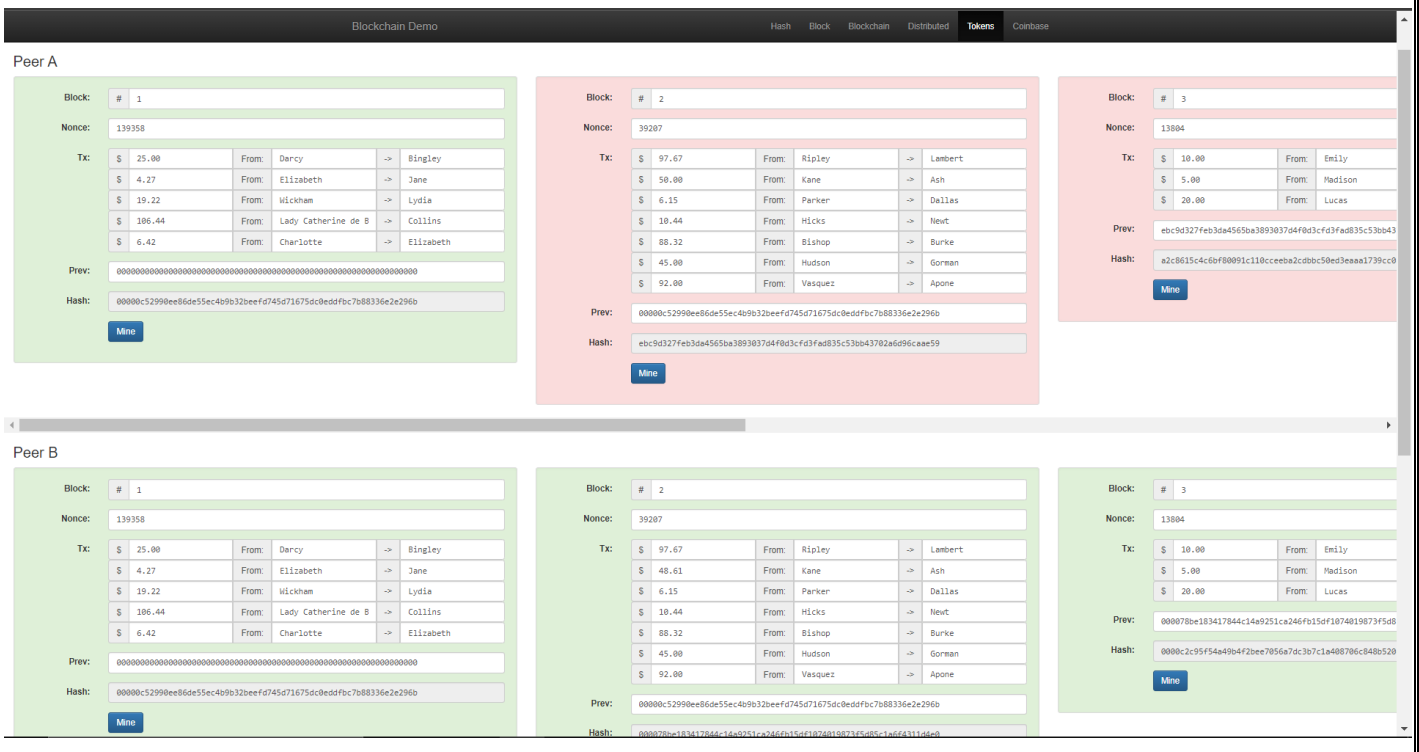


c. Need to Mine all the Blocks behind Block-2 to restore the blockchain.

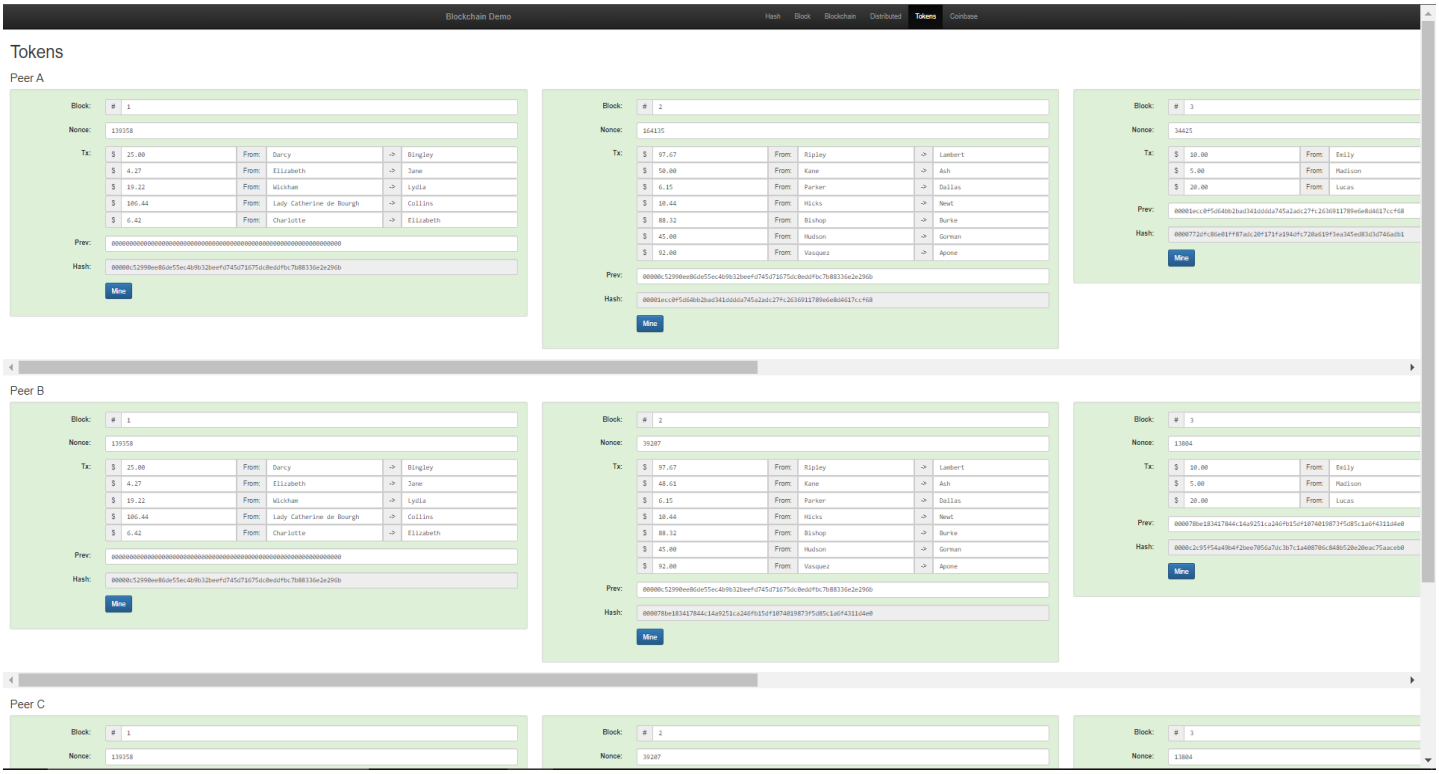


4. Studying distributed blockchain between peers with data in transaction form.

a. Changing data in transactions in block-2 for Peer-A:



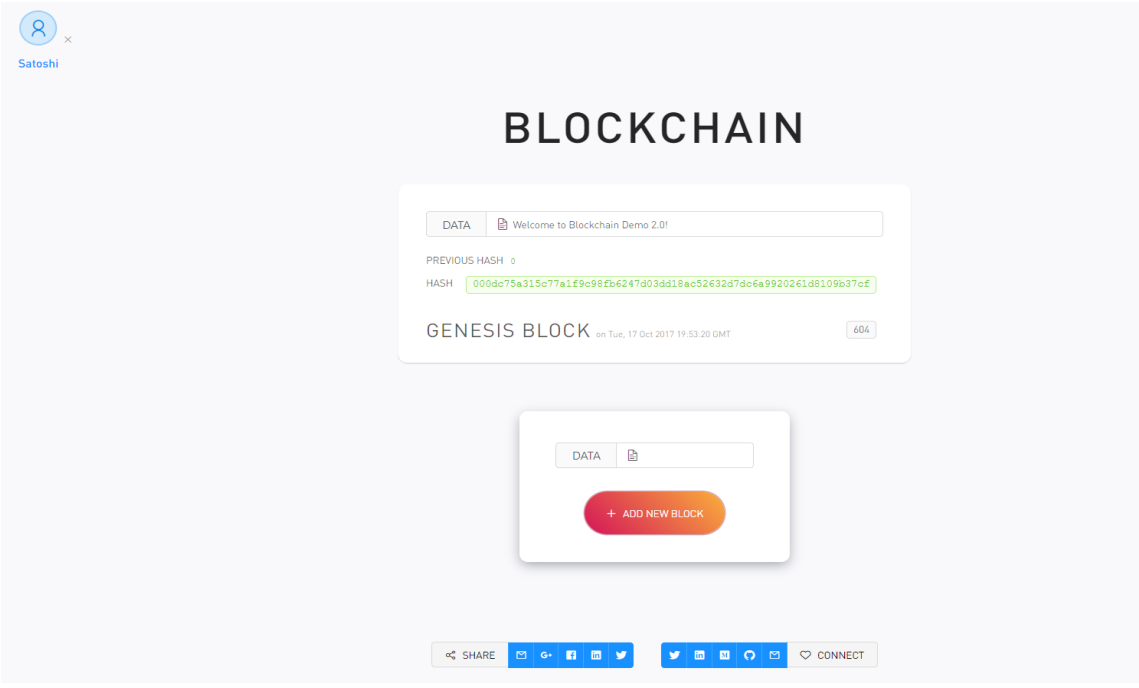
b. Need to mine all blocks including block-2 and its continuations to restore balance in blockchain of Peer A:



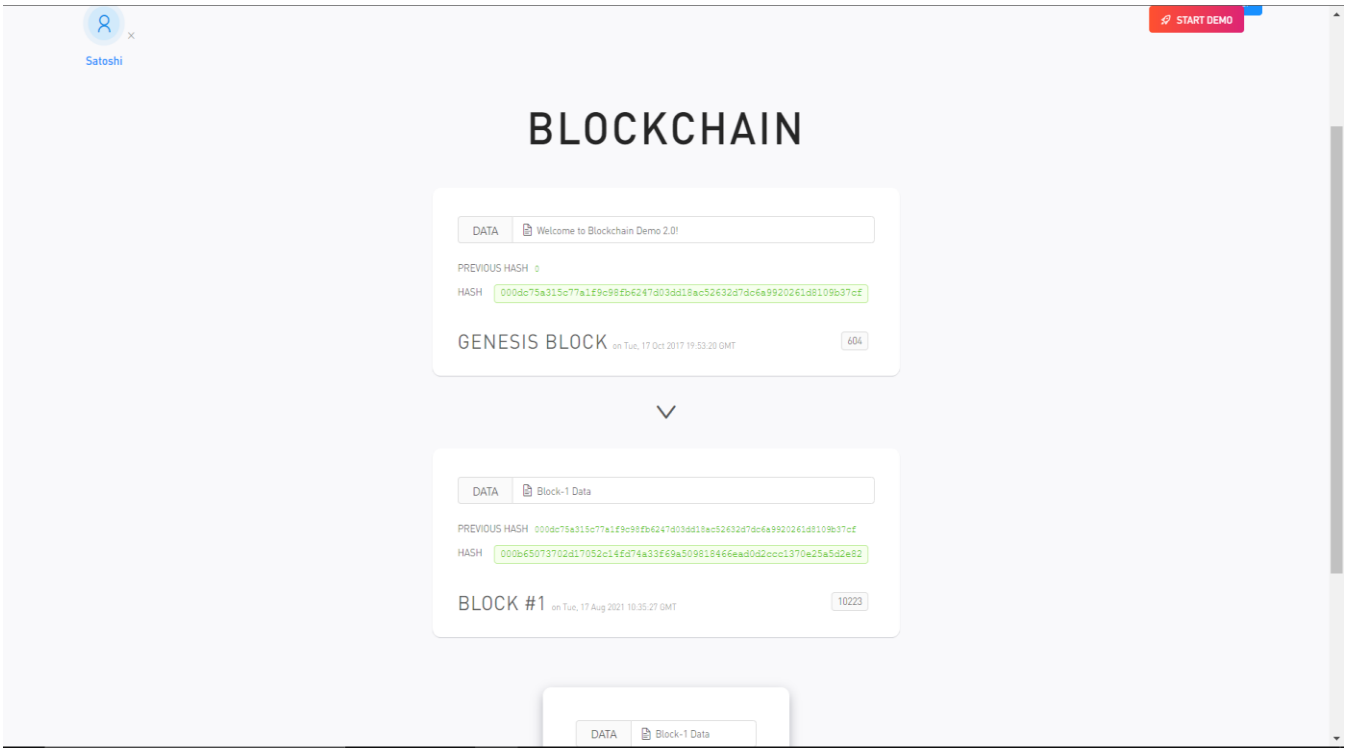
c. Hash Value of Blocks in Peer-A changes but for Peer-B and Peer-C remains the same which means A has tampered with his own chain and the chain is replaced with the original chain i.e. Peer-B or Peer-C.

5. Trying out a distributed blockchain by creating blocks by different peers and checking all peer's copy of blockchain.

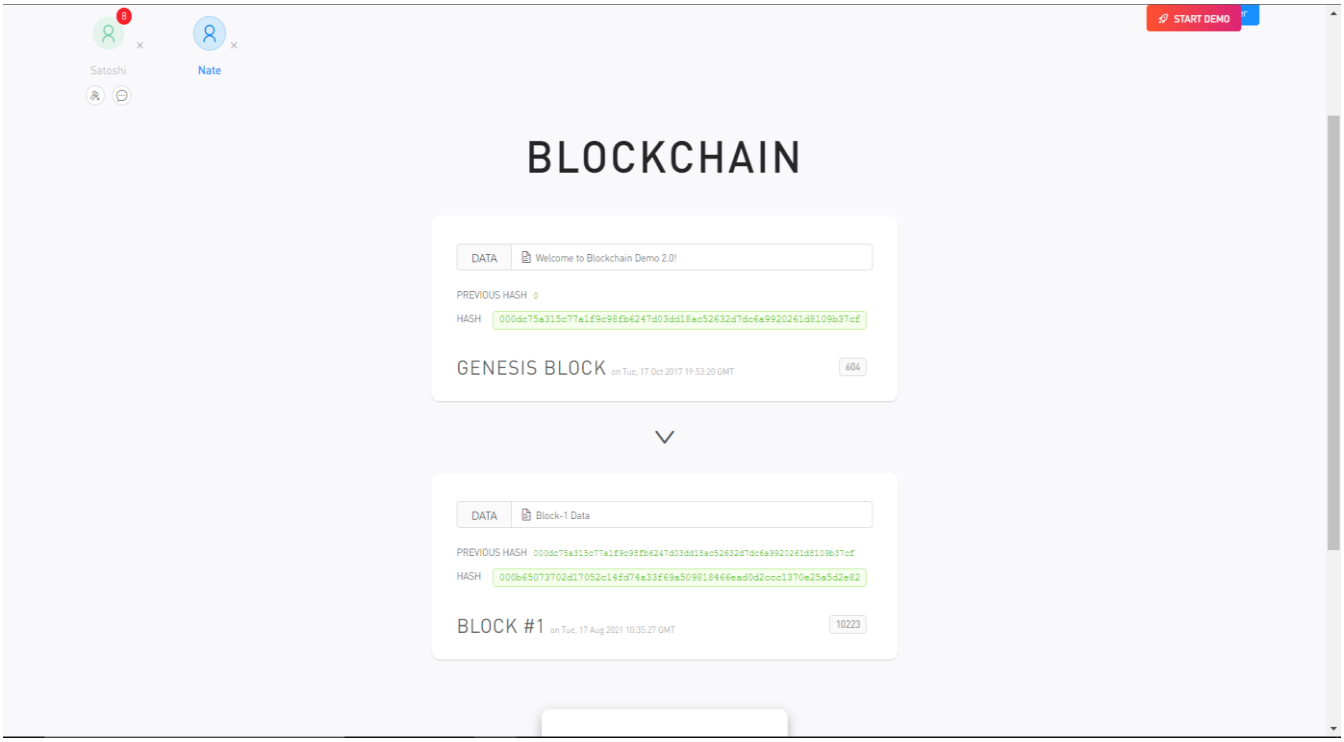
a. Initial State in Peer A's (satoshi's) blockchain.



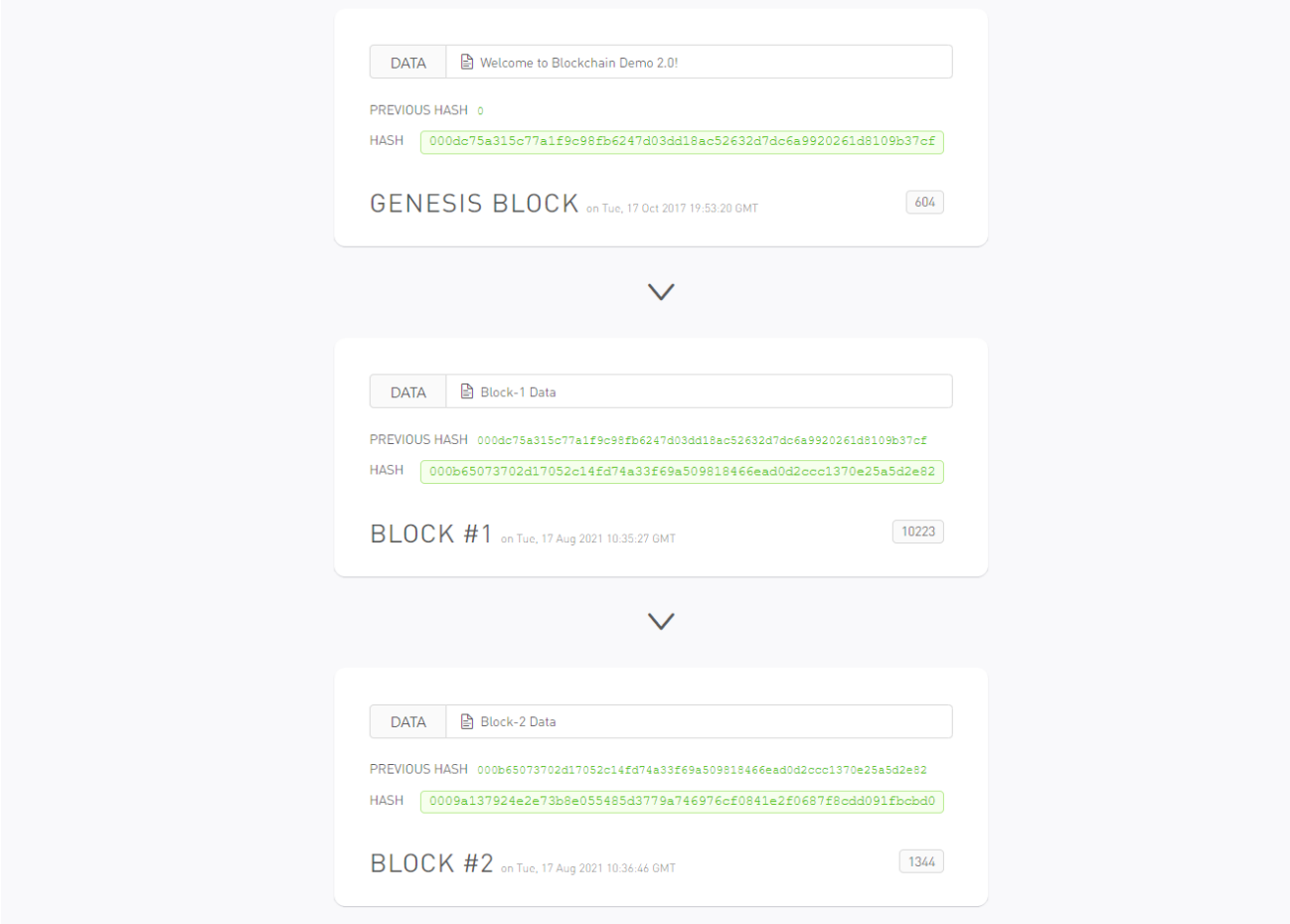
b. Creating Block-1 in Peer-A's blockchain:



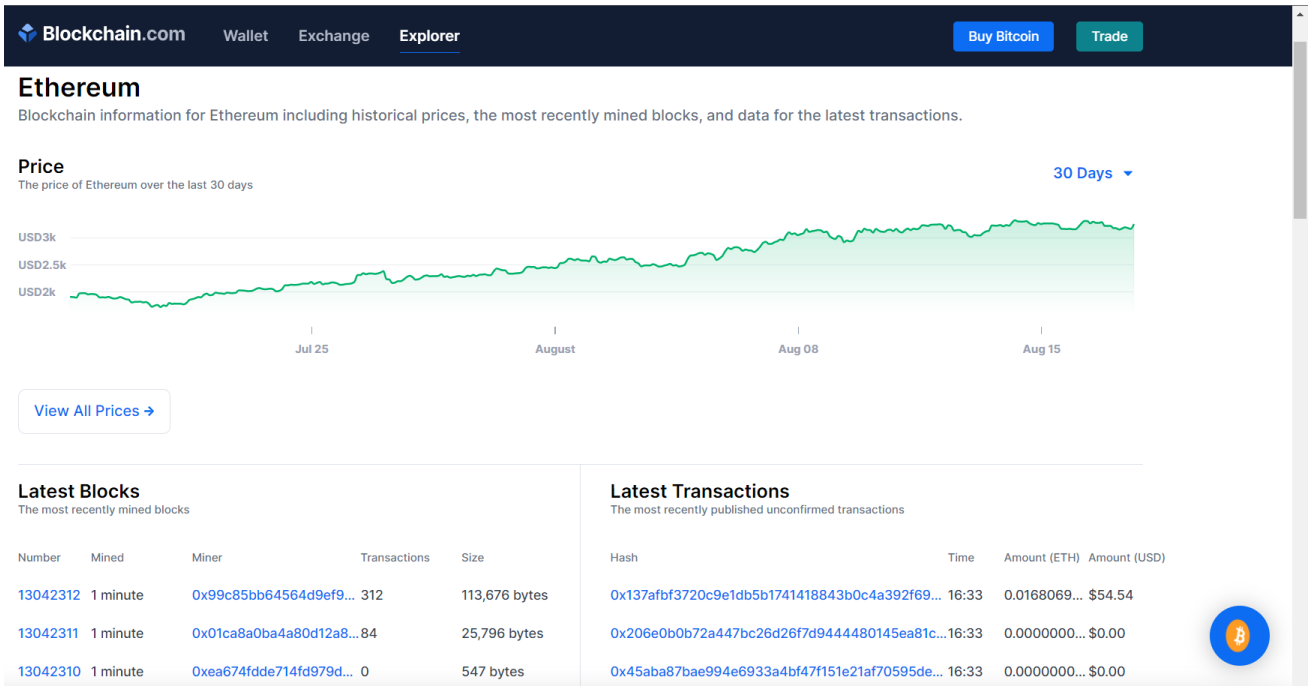
c. Creating another Peer named Peer-B(Nate) and connecting it to the Peer-A's blockchain and checking Peer B's copy of blockchain:

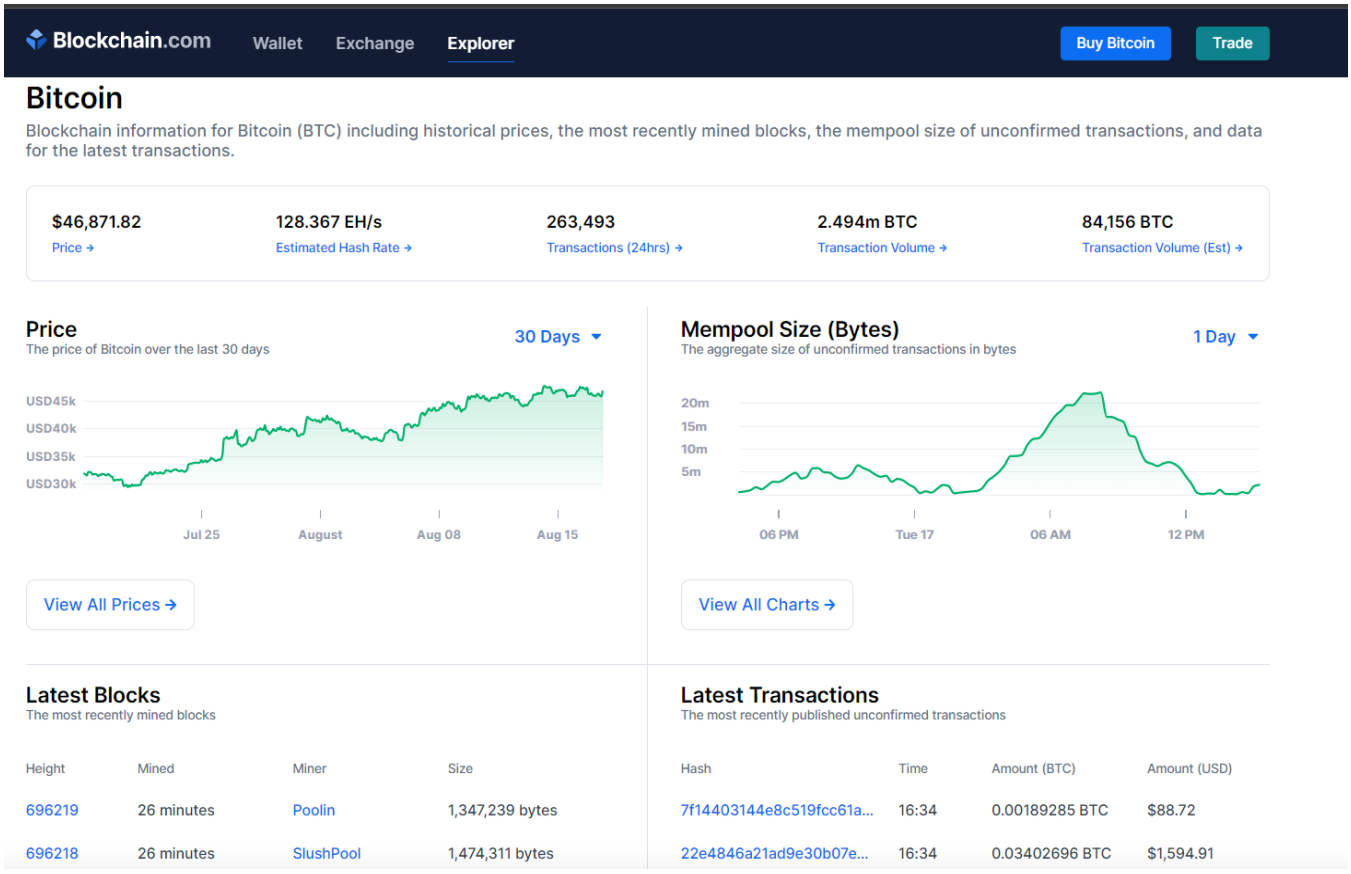


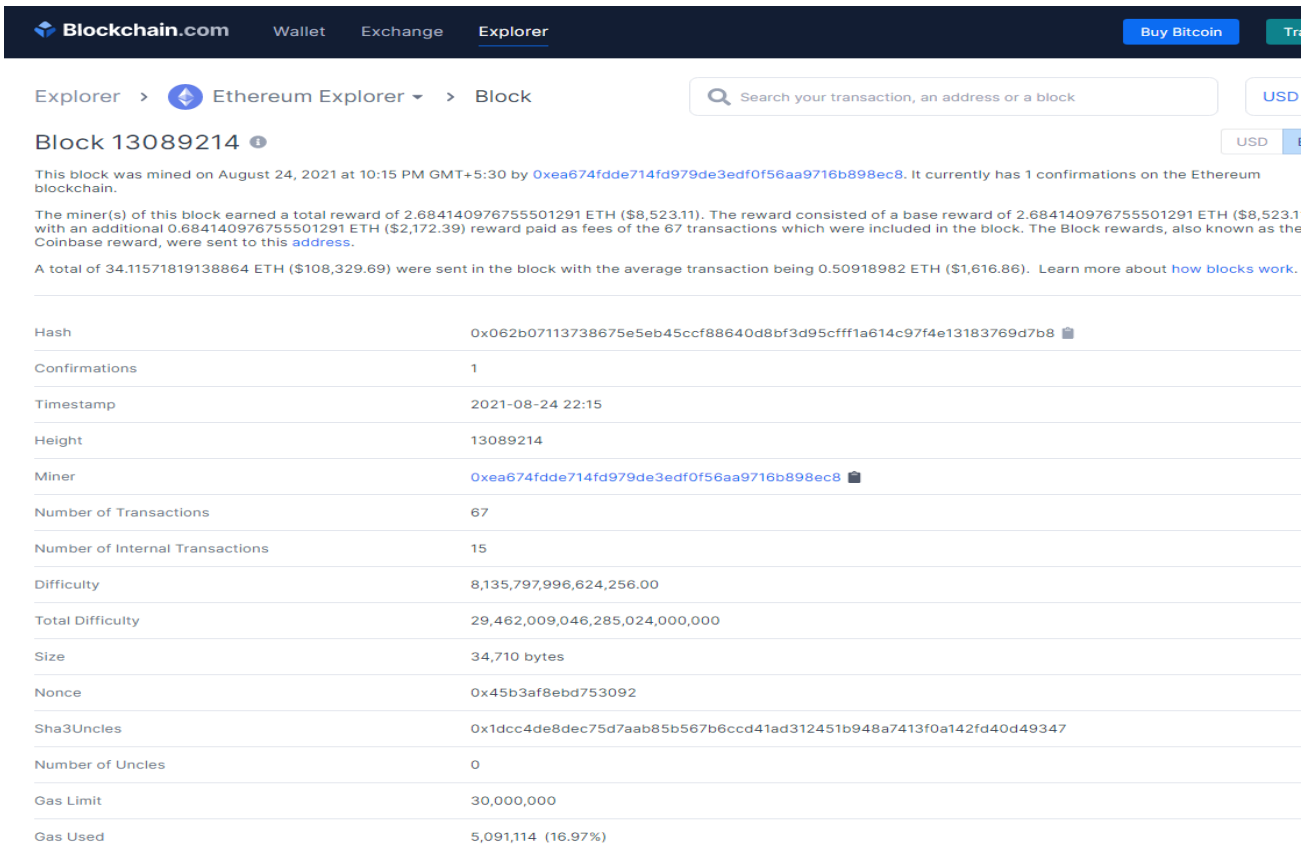
d. Let's assume Block-2 was mined by Peer-B and checking Peer A's copy of blockchain to verify the network is distributed.

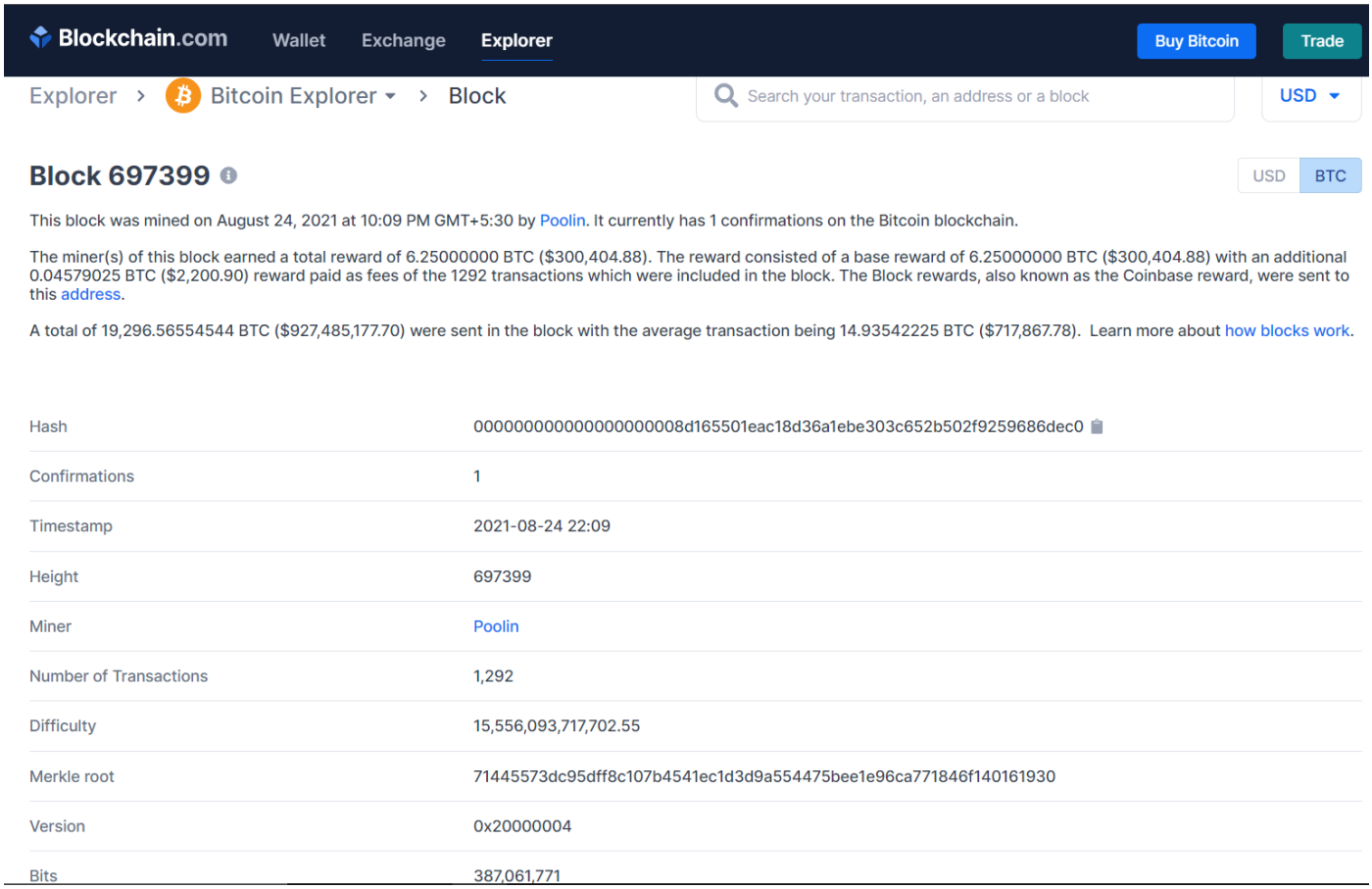


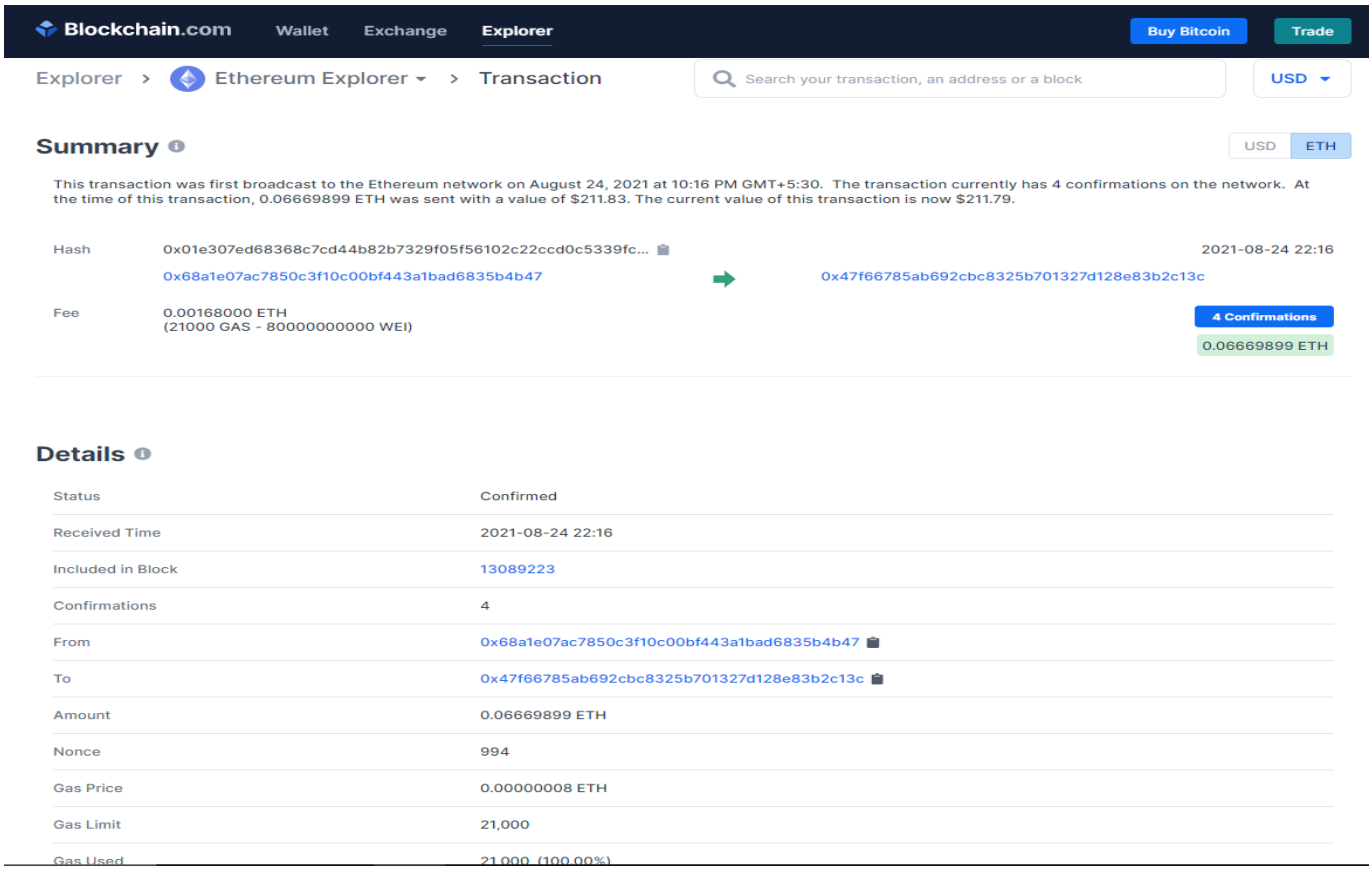
Exploring Block-Explorer to check newly mined blocks and their contents. Also observing other intricate details that a block carries and viewing all the new transactions that happened for both ETH and BTC blockchains:

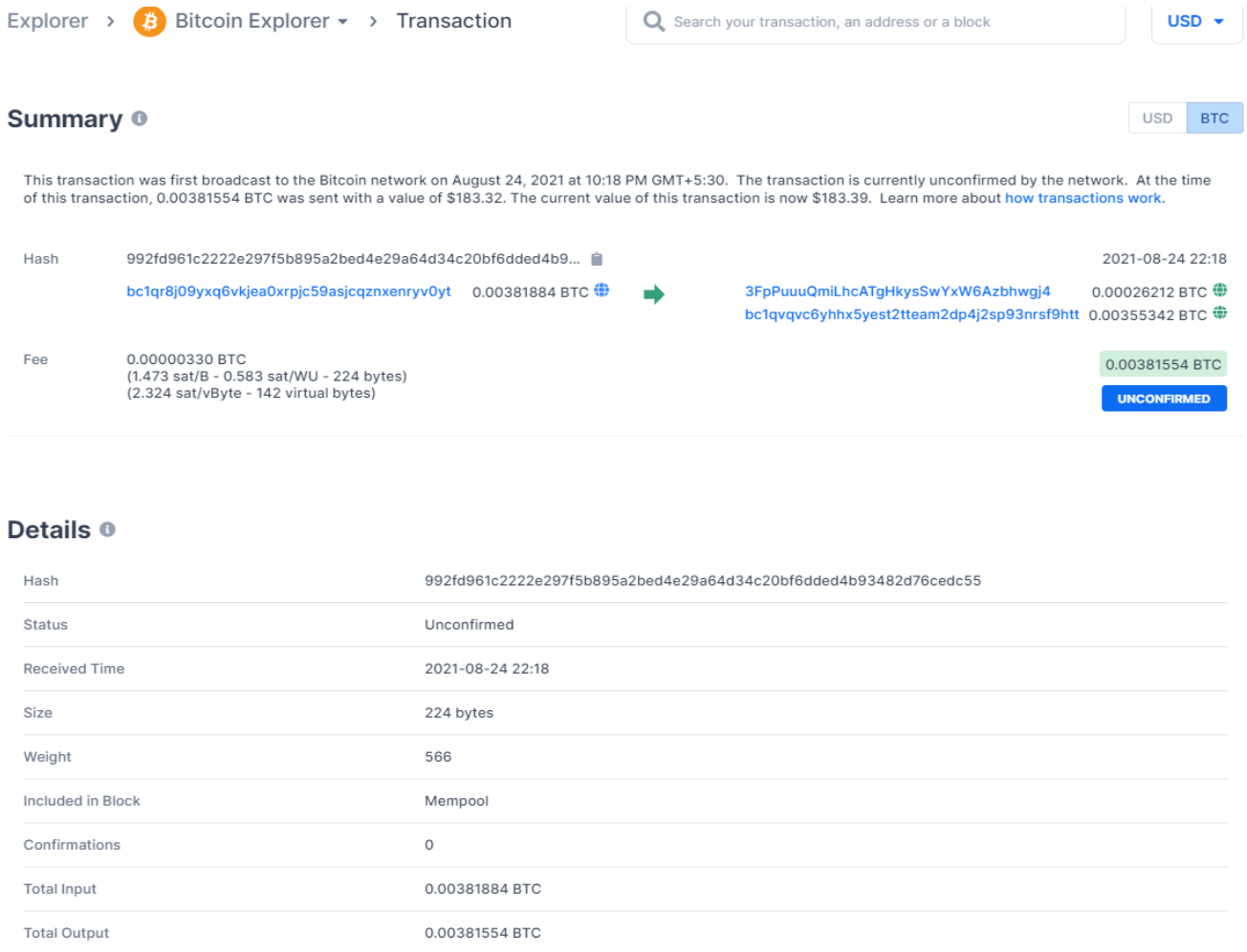



Blockchain.com
Wallet
Exchange
Explorer
Buy Bitcoin
Trade
Bitcoin
Blockchain information for Bitcoin (BTC) including historical prices, the most recently mined blocks, the mempool size of unconfirmed transactions, and data for the latest transactions.
$46,871.82
Price →
128.367 EH/s
Estimated Hash Rate →
263,493
Transactions (24hrs) →
2.494m BTC
Transaction Volume →
84,156 BTC
Transaction Volume (Est) →
Price
The price of Bitcoin over the last 30 days
30 Days
USD45k
USD40k
USD35k
USD30k
Jul 25
August
Aug 08
Aug 15
Mempool Size (Bytes)
The aggregate size of unconfirmed transactions in bytes
1 Day
20m
15m
10m
5m
06 PM
Tue 17
06 AM
12 PM
View All Prices →
View All Charts →
Latest Blocks
The most recently mined blocks
Height
Mined
Miner
Size
696219
26 minutes
Poolin
1,347,239 bytes
696218
26 minutes
SlushPool
1,474,311 bytes
Latest Transactions
The most recently published unconfirmed transactions
Hash
Time
Amount (BTC)
Amount (USD)
7f14403144e8c519fcc61a...
16:34
0.00189285 BTC
$88.72
22e4846a21ad9e30b07e...
16:34
0.03402696 BTC
$1,594.91


Blockchain.com
Wallet
Exchange
Explorer
Buy Bitcoin
Explorer
Ethereum Explorer
Block
Search your transaction, an address or a block
USD
Block 13089214
This block was mined on August 24, 2021 at 10:15 PM GMT+5:30 by 0xea674fdde714fd979de3edf0f56aa9716b898ec8. It currently has 1 confirmations on the Ethereum blockchain.
The miner(s) of this block earned a total reward of 2.684140976755501291 ETH ($8,523.11). The reward consisted of a base reward of 2.684140976755501291 ETH ($8,523.1 with an additional 0.6841409767555012 91 ETH ($2,172.39) reward paid as fees of the 67 transactions which were included in the block. The Block rewards, also known as the Coinbase reward, were sent to this address.
A total of 34.11571819138864 ETH ($108,329.69) were sent in the block with the average transaction being 0.50918982 ETH ($1,616.86). Learn more about how blocks work.
Hash
0x062b07113738675e5eb45ccf88640d8bf3d95cfff1a614c97f4e13183769d7b8
Confirmations
1
Timestamp
2021-08-24 22:15
Height
13089214
Miner
0xea674fdde714fd979de3edf0f56aa9716b898ec8
Number of Transactions
67
Number of Internal Transactions
15
Difficulty
8,135,797,996,624,256.00
Total Difficulty
29,462,009,046,285,024,000,000
Size
34,710 bytes
Nonce
0x45b3af8ebd753092
Sha3Uncles
0x1dcc4de8dec75d7aab85b567b6ccd41ad312451b948a7413f0a142fd40d49347
Number of Uncles
0
Gas Limit
30,000,000
Gas Used
5,091,114 (16.97%)


Blockchain.com
Wallet
Exchange
Explorer
Buy Bitcoin
Trade
Explorer
Bitcoin Explorer
Block
Search your transaction, an address or a block
USD
Block 697399
USD
BTC
This block was mined on August 24, 2021 at 10:09 PM GMT+5:30 by Poolin. It currently has 1 confirmations on the Bitcoin blockchain.
The miner(s) of this block earned a total reward of 6.25000000 BTC ($300,404.88). The reward consisted of a base reward of 6.25000000 BTC ($300,404.88) with an additional 0.04579025 BTC ($2,200.90) reward paid as fees of the 1292 transactions which were included in the block. The Block rewards, also known as the Coinbase reward, were sent to this address.
A total of 19,296.56554544 BTC ($927,485,177.70) were sent in the block with the average transaction being 14.93542225 BTC ($717,867.78). Learn more about how blocks work.
Hash
00000000000000000008d165501eac18d36a1ebe303c652b502f9259686dec0
Confirmations
1
Timestamp
2021-08-24 22:09
Height
697399
Miner
Poolin
Number of Transactions
1,292
Difficulty
15,556,093,717,702.55
Merkle root
71445573dc95dff8c107b4541ec1d3d9a554475bee1e96ca771846f140161930
Version
0x20000004
Bits
387,061,771


Blockchain.com
Wallet
Exchange
Explorer
Buy Bitcoin
Trade
Explorer
Ethereum Explorer
Transaction
Search your transaction, an address or a block
USD
Summary
USD
ETH
This transaction was first broadcast to the Ethereum network on August 24, 2021 at 10:16 PM GMT+5:30. The transaction currently has 4 confirmations on the network. At the time of this transaction, 0.06669899 ETH was sent with a value of $211.83. The current value of this transaction is now $211.79.
Hash
0x01e307ed68368c7cd44b82b7329f05f56102c22ccd0c5339fc...
2021-08-24 22:16
0x68a1e07ac7850c3f10c00bf443a1bad6835b4b47
0x47f66785ab692cbc8325b701327d128e83b2c13c
Fee
0.00168000 ETH
(21000 GAS - 80000000000 WEI)
4 Confirmations
0.06669899 ETH
Details
Status
Confirmed
Received Time
2021-08-24 22:16
Included in Block
13089223
Confirmations
4
From
0x68a1e07ac7850c3f10c00bf443a1bad6835b4b47
To
0x47f66785ab692cbc8325b701327d128e83b2c13c
Amount
0.06669899 ETH
Nonce
994
Gas Price
0.00000008 ETH
Gas Limit
21,000
Gas Used
21,000 (100.00%)



Details

Hash	992fd961c2222e297f5b895a2bed4e29a64d34c20bf6dded4b93482d76cedc55
Status	Unconfirmed
Received Time	2021-08-24 22:18
Size	224 bytes
Weight	566
Included in Block	Mempool
Confirmations	0
Total Input	0.00381884 BTC
Total Output	0.00381554 BTC

Conclusion:

We have explored almost everythings related to the basics of blockchain technology, its structure, processes involved and how blocks are mined. We have also studied the components of a block in ETH and BTC mainnet blockchain. Moreover, we have also seen the structure of transactions and time span to mine a block in ETH and BTC blockchain.