

AUGUST, 2018

TESTNET ALPHA & BLOCKCHAIN EXPLORER

What Does the TestNet Alpha Consist of?

The TestNet Alpha consists of the following components:

Network Node

Boot Node

PoA Node

PoW Node

The current network protocol implementation assumes single Boot Node in the network. This will not be a rigid condition in upcoming releases. Even in current form we expect 1000 Network Nodes as a manageable load. Load-balancing for PoW and PoA Nodes is done automatically. In theory, one Network Node is capable of supporting up to 10,000 clients.

For the moment, the TestNet Alpha has:

5 Network Nodes

1 Boot Node

10 Pow Nodes

15 PoA Nodes

organized in PoA Team
of 2 members each

Remittance flow is implemented with 100 wallets randomly issuing transactions at each other with the speed of 1000 TPS.

Network Node

Network Node guarantees network consistency, stores unpublished transactions in the pending, balances a workload among multiple clients, stores shards and computes state changes in the distributed ledger.

Boot Node

Currently, a Boot Node instance requires a machine with a public IP, works as the entry point to the TestNet for new nodes and performs only load-balancing function.

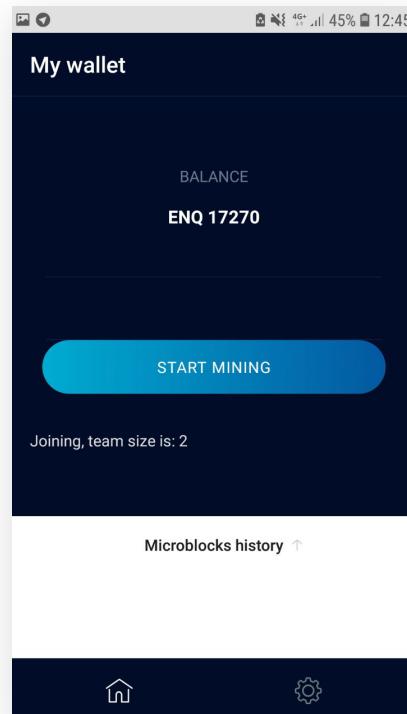
PoA

PoA Node is implemented as a mobile application. The key function of a PoA Node in the network is mining microblocks and including transactions from the pending to these microblocks. This process is called **publishing**.

Download & Install the Apk

https://github.com/Enecuum/AndroidApp/blob/ui_fixes/app-debug.apk

Push button "Start mining"



Enecuum HK Limited

PoW

PoW Node is implemented as a desktop application for Windows and Linux. The key function of a PoW Node is mining K-blocks searching for a hash matching the current difficulty level. This process is called **mining**.

Workflow

The consensus algorithm is currently implemented in the following way:

PoW Nodes mine K-blocks matching the current difficulty level and broadcast them over the network. When a K-block reaches another PoW Node or a Network Node it is verified and upon successful verification is added to the local copy of the blockchain stored on the node.

Upon entering the network, PoA Nodes are organized into PoA Teams and listen for a K-block event. When such event happens and a K-block reaches a PoA Team, its members request a certain number of transactions from the pending of a Network Node, create microblocks using those transactions and publish them into the network.

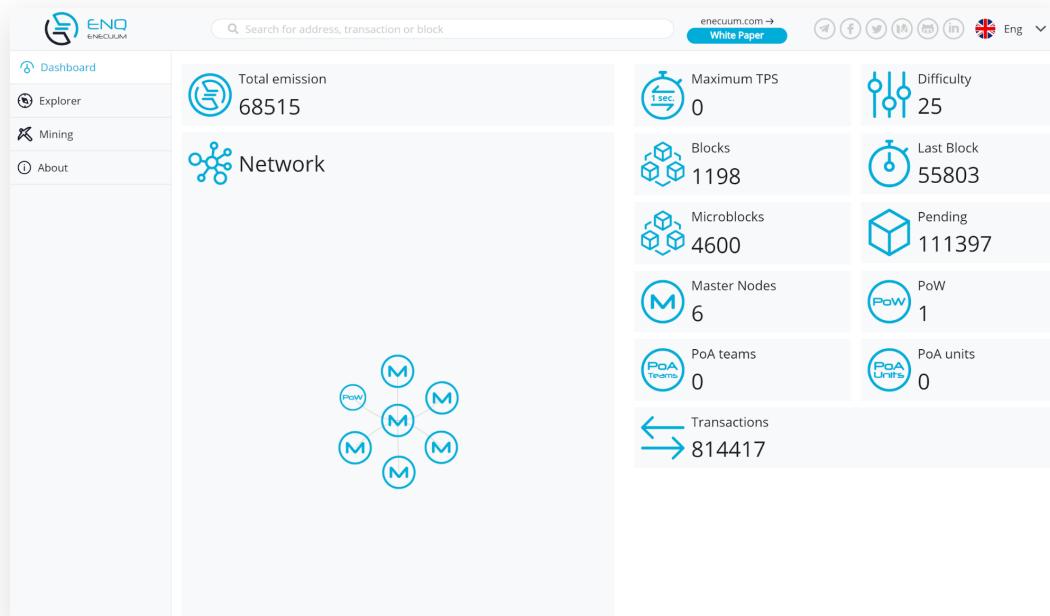
All published microblocks are verified and, upon successful verification, are added by all Network Nodes to their local database, and are used in computing state changes in the distributed ledger.

What is the Blockchain Explorer?

The Blockchain Explorer is a web application that is capable of connecting to an arbitrary Network Node to obtain various network and system parameters using the API of that node.

The user interface of the Blockchain Explorer is organized in the following way:

1. Dashboard - the page with real-time metrics obtained from the Network Node



- 1. Maximum TPS** - max number of transactions published in the network per second (transactions that have been included into microblocks).
- 2. Blocks** - overall number of K-blocks (incl. forks) in the blockchain
- 3. Master Nodes** - number of active Network Nodes
- 4. PoA teams** - number of active PoA Teams
- 5. Microblocks** - overall number of microblocks in the blockchain
- 6. Transactions** - overall number of transactions in the blockchain
- 7. Difficulty** - current difficulty level for mining K-blocks
- 8. Last Block** - time in seconds since the last K-block
- 9. PoW** - number of active PoW Nodes
- 10. PoA units** - number of active PoA Nodes (mobile devices)
- 11. Pending** - number of transactions in the pending available for publishing
- 12. Total emission** - total emission (incl. emission generated by mining)
- 13. Network** - map of the network. This map is updated in real-time and allows for minor inconsistency as it is not possible to 100% accurately depict all the details.

2. Explorer - the page where user can search for and view specific blockchain information (K-blocks, microblocks, transactions, wallets)

2.1 Overall information on blocks (no depth):

Hash	From	To	Amount
b3duZx0yMjAwNjvd2SicjyMDA2N293...	cmvJZWl2Zx0yMjAwNjhyZWNlaXZicjyM...	1 ENQ	
b3duZx0yMjAwNzjvd2SicjyMDA3Mr93...	cmvJZWl2Zx0yMjAwNzNyZWNlaXZicjyM...	4 ENQ	
b3duZx0yMjAwNzvdv2SicjyMDA3N293...	cmvJZWl2Zx0yMjAwNzhyZWNlaXZicjyM...	3 ENQ	
b3duZx0yMjAwOjvd2SicjyMDA4M9...	cmvJZWl2Zx0yMjAwOjNjZWNlaXZicjyM...	2 ENQ	
b3duZx0yMjAwOjvd2SicjyMDA4N293...	cmvJZWl2Zx0yMjAwOjhyZWNlaXZicjyM...	2 ENQ	
b3duZx0yMjAwOTjvd2SicjyMDA5Mm93...	cmvJZWl2Zx0yMjAwOTNyZWNlaXZicjyM...	7 ENQ	
b3duZx0yMjAwOTjvd2SicjyMDASN293...	cmvJZWl2Zx0yMjAwOTNyZWNlaXZicjyM...	10 ENQ	
b3duZx0yMjAxMjvd2SicjyMDEwM9...	cmvJZWl2Zx0yMjAxMjNjZWNlaXZicjyM...	9 ENQ	
b3duZx0yMjAxMjvd2SicjyMDEwN293...	cmvJZWl2Zx0yMjAxMjPhyZWNlaXZicjyM...	5 ENQ	
b3duZx0yMjAxMTjvd2SicjyMDEwM93...	cmvJZWl2Zx0yMjAxMTNyZWNlaXZicjyM...	6 ENQ	
b3duZx0yMjAxMTjvd2SicjyMDEwN293...	cmvJZWl2Zx0yMjAxMTNyZWNlaXZicjyM...	7 ENQ	
b3duZx0yMjAxMjvd2SicjyMDEyMm93b...	cmvJZWl2Zx0yMjAxMjPhyZWNlaXZicjyM...	7 ENQ	
b3duZx0yMjAxMjvd2SicjyMDEyN293b...	cmvJZWl2Zx0yMjAxMjPhyZWNlaXZicjyM...	2 ENQ	
b3duZx0yMjAxMjvd2SicjyMDEzMm93...	cmvJZWl2Zx0yMjAxMzNyZWNlaXZicjyM...	5 ENQ	
b3duZx0yMjAxMjvd2SicjyMDEzN293b...	cmvJZWl2Zx0yMjAxMzNyZWNlaXZicjyM...	10 ENQ	

This screen shows general information on the blocks, where:

- 1. Height** - number of the block in the chain
- 2. Hash** - hash of the associated K-block (meaning each associated microblock contains the hash of this K-block)
- 3. Microblocks** - number of microblocks in the macroblock (macroblock = microblocks + the associated K-block)
- 4. Prev Hash** - hash of the previous block
- 5. Nonce** - the winning number serving as the second part of the proof in the Proof-of-Work algorithm
- 6. Miner** - public key of the solver that mined the block

2.2 Block details (1st level of depth):

Block details

Height: 1052
Nonce: 1958125
Microblocks attached: 34

Hash: AAAAD8FBQNOYSjTdohtdedTOsk1ACFFKDhWwvDuLu8=

Time: 2018-08-14 04:23:09
Solver: Ov\$8LmmcMa4mEWbfOSZFrqT6AYRizzQ...
Type: 0

Microblocks in the Block

Hash	Publisher	Tx amount
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	250	
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	200	
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	0	
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	0	
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	0	
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	50	
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	100	
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	100	
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	100	
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	50	
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	0	
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	100	
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	150	
b8mRx86m15mYg9E1fn1l6SVPRFSeGslb53a3Y8gFA	0	

This screen shows details for the given block, where:

1. **Height** - number of the K-block in the chain
2. **Nonce** - the winning number serving as the second part of the proof in the Proof-of-Work algorithm
3. **Microblocks attached** - number of microblocks in the macroblock
(macroblock = microblocks + the associated K-block)
4. **Time** - time and date the given K-block was created on
5. **Solver** - public key of the miner that create the given K-block
6. **Microblocks in the block** - complete list of associated microblocks where:
 - 6.1 **Hash** - hash of the microblock
 - 6.2 **Publisher** - public key of the PoA Node that created the microblock
 - 6.3 **Tx amount** - number of transactions in the given microblock

2.3 Microblock details (2nd level of depth):

List of blocks					
Height	Hash	Microblocks	Prev hash	Nonce	Miner
1082	AAAAAGDyaApxt2DKKV8TAjgtqkSEB6kgPC/Psn1]Y=	0	AAAAGDyaApxt2DKKV8TAjgtqkSEB6kg...	1199964	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1081	AAAAGDyaApxt2DKKV8TAjgtqkSEB6kgPC/Psn1]Y=	0	AAAAGDyaApxt2DKKV8TAjgtqkSEB6kg...	761323	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1080	AAAAGDyaApxt2DKKV8TAjgtqkSEB6kgPC/Psn1]Y=	0	AAAAGDyaApxt2DKKV8TAjgtqkSEB6kg...	1025538	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1079	AAAAMHYXUhg59FoPxxwzCiOnffpcnhC4e9UMkrbOpo=	0	AAAAMHYXUhg59FoPxxwzCiOnffpcnhC4e9UMkrbOpo=	231405	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1078	AAAANKNlQ7ofMaLzVfQx9d9IV2d4vkiRmvgv9jE=	0	AAAANKNlQ7ofMaLzVfQx9d9IV2d4vkiRmvgv9jE=	623028	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1077	AAAAMEYYD+mxuKxeTeSatDx0yXB74aloLNdpq+wM8Y=	0	AAAAMEYYD+mxuKxeTeSatDx0yXB74aloLNdpq+wM8Y=	1396337	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1076	AAAACAH31M1MSFLBLj6u5Oh6eMX18z284/uqnD=	0	AAAACAH31M1MSFLBLj6u5Oh6eMX18z284/uqnD=	2226349	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1075	AAAAMym1bfz/dRf550xFM/T1XGwqZtaPLry/m1sMoM=	0	AAAAMym1bfz/dRf550xFM/T1XGwqZtaPLry/m1sMoM=	1446226	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1074	AAAACoAYFpi/zWzvMEYfjz/j03bg3fjucDxRynsS84s=	0	AAAACoAYFpi/zWzvMEYfjz/j03bg3fjucDxRynsS84s=	440339	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1073	AAAAGFg5fQLql2KwvswsVAOUUp+KRA79GfAkssUlyckxs=	0	AAAAGFg5fQLql2KwvswsVAOUUp+KRA79GfAkssUlyckxs=	1452553	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1072	AAAAGUmFHlSmz6MtsFzczZS09Fe3oqReUpojlsvr/v=	0	AAAAGUmFHlSmz6MtsFzczZS09Fe3oqReUpojlsvr/v=	1535796	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1071	AAAALLDNKKUuAE1596DGZ3y4gutcumEy44E3KCa7jU=	0	AAAALLDNKKUuAE1596DGZ3y4gutcumEy44E3KCa7jU=	290087	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1070	AAAAMXE2EOabt6kFKkYRwpesTY17hQT3KQvPUEpTD=	0	AAAAMXE2EOabt6kFKkYRwpesTY17hQT3KQvPUEpTD=	1169775	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1069	AAAACIZPwSwzfFayTAxid7myHK7k3Waladwo48hB=	0	AAAACIZPwSwzfFayTAxid7myHK7k3Waladwo48hB=	443967	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1068	AAAAMjQYIMBPj85j8ir7E7h/jaw48yfnpTsf6zxg=	0	AAAAMjQYIMBPj85j8ir7E7h/jaw48yfnpTsf6zxg=	1919868	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1067	AAAAFz32BB4f88MX0G+0TruDhd3C2k96UUFLN3G70=	0	AAAALh4AmAmm590b5blrwWhMb7...	2015922	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1066	AAAALi4tmAm590b5blrwWhMb7+q+0cXg0/gA1A=	0	AAAAGV4aGs5qpt54v5b5lgvXZmlt4k4FCnCqUjAgBzQ=	1770450	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1065	AAAAGV4aGs5qpt54v5b5lgvXZmlt4k4FCnCqUjAgBzQ=	0	AAAAP:Egy8hQCGP4yIm99sSwop2/8iG23wmwaa5RHk=	1849453	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1064	AAAAP:Egy8hQCGP4yIm99sSwop2/8iG23wmwaa5RHk=	0	AAAAP:Egy8hQCGP4yIm99sSwop2/8iG23wmwaa5RHk=	803298	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...
1063	AAAAbpN8j6f2cCRAm5ep9fqr1mHand...	0	AAAAbpN8j6f2cCRAm5ep9fqr1mHand...	1186753	Ov58LmmcMa4mtEWbfOSZfkqT6AYRi...

This screen shows general information on the blocks, where:

1. Block - hash of the associated K-block (meaning this hash is included in the microblock; microblocks + associated K-block = a macroblock)

2. Tx attached - number of transactions in the microblock

3. Publisher - public key of the PoA Node that created the microblock

4. Transactions in the microblock - transaction details, where:

4.1 Hash - hash of the transaction in the microblock

4.2 From - public key of the sender of the transaction

4.3 To - public key of the recipient of the transaction

4.4 Amount - amount sent in the transaction

2.4 Transaction details (3rd level of depth)

The screenshot shows a 'Transaction details' page with the following fields:

- Hash: SmHvtjazZ/V64FFWo1NwSgW8UGxKb2wN4MrfMTM0M0=
- From: b3duZXlyMjAwNjdvd25lcjlyMDA2N293bmV...
- Time: 2018-08-14 04:08:50
- To: cmVjZWl2ZXlyMjAwNjhyZWNLiaXZlcjlyMDA2...
- Value: 1 ENQ

A 'Copy' button is located in the top right corner.

This screen shows the usual information on the transaction, where:

- 1. From** - public key of the sender of the transaction
- 2. To** - public key of the recipient of the transaction
- 3. Time** - and the exact time and date of its generation
- 4. Value** - amount sent in the transaction

2.5 Public key details

The screenshot shows a 'Wallet' page with the following details:

- Hash: b3duZXlyMjAwNjdvd25lcjlyMDA2N293bmVyMjJwMDY3duZXlyMjAwNjdvd25lcj=
- Balance: 99 ENQ

A 'Copy' button is located in the top right corner.

Below this, there is a section titled 'Committed transactions' with a table:

Hash	From	To	Amount
SmHvtjazZ/V64FFWo1NwSgW8UGxKb...	b3duZXlyMjAwNjdvd25lcjlyMDA2N293...	jhyZWNLiaXZlcjlyMDA2OHIjY2VpdmVyMjJ...	1 ENQ

Clicking on a public key, user can see the current balance and transaction history of the associated wallet. If there are no transactions for the wallet, the page will show only the balance, i.e. the emitted mining reward.

Search bar

There is also a search bar on all the screens for searching for a specific transaction/microblock/K-block using its hash.