
THE FUTURE OF
TECHNOLOGY
netrum.io
Whitepaper V 1.0

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1 Background

The increasing popularity of decentralized technology in 2019 comes with definite reasons. Users of technology are much more informed than they once were. Meanwhile, people are innovating to find out the most convenient and safest method of digital transactions. Centralized technology, which has been around for many years, is associated with several problems. They include the following:

- ✓ **Trust**

  The centralized technology is mainly controlled by a third-party authority, which serves as a bridge between the first and the second party. In financial industry, the third party is a bank. When you want to send money for instance, you actually send it to the bank. Then, the bank sends the money to the recipient. In other words, a third party actually keeps the records of your transactions.

  This raises some concerns among the users of financial system. It is about trust. Some questions arise on whether the transaction records are kept private or not, whether the clients' identity are kept secured or not, whether the technology used by the bank is powerful enough to fight against hackers or not, and many more.

  The problems of trust are even prevalent in the last several years, when more and more customers of financial institutions become the victims of personal information abuse. This proves that not every financial institution applies secured protection over the clients' identity. When identity thefts get into the system, the clients always become the disadvantaged party.

- ✓ **Scalability and Reliability**

  As the volume of financial transaction keeps increasing, the issues of scalability and reliability become more prevalent. Customers of conventional financial system begin to question scalability of the current system. When the system fails to scale accordingly, the transactions will be faced with several problems like delays, downtime, loss, and many more.

  These may result in substantial financial loss on the part of customers. Furthermore, failure of scalability automatically affects reliability. Unreliable systems will not be able to manage the transactions properly.

- ✓ **Costs**

  Involvement of the third-party service leads to increasing costs. The first and the second parties are required to pay some fees to the third party. The fees come in different reasons like account management, transaction fees, service fees, and many more. Meanwhile, a decentralized financial system eliminates the third-party fees since the transactions happen directly between the first and the second party.

Fortunately, the coming of blockchain technology in 2009 has successfully changed people's mindset on the financial technology. More people are now shifting from the centralized to decentralized technology. Bitcoin is the first digital currency (cryptocurrency) backed by blockchain technology. As Bitcoin grows successfully, more cryptocurrencies are now entering the competition platform.

Blockchain technology revolutionizes the system as a whole, not only how the transactions are done, but also how businesses are done in different levels. The cryptocurrency market is now flooded with so many coins and tokens issued by different business entities with different motifs. A number of digital coins, tokens,

and projects are based upon blockchain. However, some others simply adopt the essence of blockchain and use unique and interesting names.

Unfortunately, the blockchain technology still has so many things to do to affect people's daily life in a significant way. In spite of so many digital coins in circulation, they provide little, if any, impacts upon the daily life. For instance, few, if any, cryptocurrencies provide mobile apps, which allow the users to make transactions while away from home. As a result, the blockchain technology still focuses on the development of cryptocurrency projects, while virtually overlooking their uses in real life. As a result, the meaning is reduced to simply market values of the crypto money. Actually, blockchain was developed as a revolutionary bridge to the development of applied technology.

The good news is that a number of cryptocurrency projects appear to help addressing the problem. One of them is NETRUM, which is backed by NETRUM Eco System. NETRUM offers hassle-free physical realization to facilitate digital asset exchanges. The NETRUM Coin System is expected to revolutionize the blockchain financial system. In the end, the wall between the physical and digital worlds will ruin.

1.1 Problems

A number of benefits offered by Blockchain technology bring about the development of Altcoin throughout the world. Now, there are more than 2000 types of coins/projects registered on coinmarketcap.com. More digital coins are circulating. As a result, more problems are identified. Blockchain technology was recently faced with some major problems, particularly in relation to production costs and electric bills. Mining process is considered not environmental friendly, since it requires substantial electric power. Globally, the electric power required

for a Bitcoin mining equals to electric consumption in 159 countries around the world!

Another problem is that Bitcoin, Ethereum, and many other PoW (Proof of Work)-based Altcoins are very slow in processing the transactions. They were even slower than the conventional digital payment systems like Visa card and PayPal. Bitcoin networks can only process, on average, 4-6 transactions per second. Meanwhile, Visa card can process up to 40,000 transactions per second.

Given those problems, Bitcoin technology now has a problem with reliability and scalability. Is the technology able to scale based on the volume of digital transactions? Or, is the platform not dependable enough to accommodate all the transactions? When the system is unable to run smooth under heavier workload, there must be a problem with its dependability and scalability.

1.2 How Blockchain Works

Blockchain works based upon a trustless and distributed consensus system. What do they mean? The system means that you do not need to depend and/or trust athird party to send and/or receive money from someone else. You can send the money directly or receive it right from the sender. This is what makes cryptocurrency transactions different from conventional transactions. In conventional financial system, you actually send the money to a third party (for instance, banks, Visa, PayPal, MasterCard, and many more). Then, the third party sends the money to the recipient. What does this mean? You need to trust a third party.

With cryptocurrency system, anyone in the ledger (network) has the copy of transactions. Anyone has similar functions and roles. There is no need for a third party. Anyone can see the transactions, but only the real recipient can verify the information directly.

2 Introducing NETRUM

Cryptocurrency has reached a maturity level, in which it now serves as a digital asset. It enables the owners to send transactions instantly, privately, and securely throughout the networks. The network is independent. It regulates the development and growth on its own way. Yes, cryptocurrency has a decentralized system. In addition to the technical challenges, the cryptocurrency has to face tightening challenges from credit cards, banks, and fiat currencies. As a result, cryptocurrency needs added values to enable it to work safely and perform better. Actually, the success of cryptocurrency depends upon several factors, like peer-to-peer (P2P), price stability, safety, distribution networks (consensus distribution), decentralized system, and ease of operation.

NETRUM offers the solution for all the limitations currently associated with most of digital currencies. It is developed as a new cryptocurrency that will facilitate the users to meet their needs. NETRUM is built upon a dependable platform. It will be integrated into the existing financial systems, of course with many added values. They include improved security, greener technology, mobile technology, and even localization. NETRUM Coin provides some advantages for the users with more options. They include Bitcoin open source and fast transaction process. Besides them, the following are among the advantages offered by NETRUM :

- Combination of PoS (Proof of Stake) and PoW (Proof of Work)
- Masternode
- Varied Wallet Options
- Mobile apps
- Integration with local economic systems in the country, where it operates

- Integration with the existing financial systems
- Added value for people as it will facilitate the users in varied sectors like education, and many more

NETRUM also keeps improving the platforms the objectives, visions, and strategies. In the end, the cryptocurrency will have improved usage in the real-life. It is not left in the desktop. Instead, the platform will go anywhere with the owners, since NETRUM will come in mobile apps. It will be accessible from different gadgets based upon different operating systems like Android, iOS, and many others.

3 NETRUM Technology

Blockchain-based NETRUM offers better Scalability, higher Transaction Speed and Security compared to Bitcoin or Ethereum. The creation of ecosystem for a new Cryptocurrency is paramount. Thus the utility of Netrum can function in real-life condition, and hopefully NETRUM will be solutions of many today's financial obstacles. Using the blockchain platform and smart contract feature, it will produce many new token-based projects running on NETRUM Blockchain. This particular application is termed Decentralized Applications or Dapps.

3.1 Proof of Work (PoW)

PoW is a computer algorithm used to solve Block puzzles to reach verification agreements. PoW requires a miner/ miners to verify new blocks. This process takes a long time and has a lot of energy and requires the best computational speed to win new block rewards.

On the other hand, miners need the best and fastest computation capability to win the new blocks. PoW works to deter cyber-attacks like Distributed Denial-of-Service (DDoS) during the mining process. DDoS exhausts considerable resources. When DDoS is deterred, the mining process will be faster and spending fewer resources. In other words, PoW is necessary for expensive computer calculation, called mining, which aims at creating new blocks on blockchain (distributed ledger) and verifying the legitimacy of transactions. PoW is actually the conventional system in mining. It works in the following ways :

- The first miners who solve the blocks problems get the reward.

- Miners need to compete each other and use the best method to be the first to solve the mathematical problems.
- Sometimes, miners do not actually own the coins minted from the mining process.

Proof of Work (PoW) system is used in NETRUM for the first 50.000 blocks. The next blocks will be continued by using Proof of Stake (PoS) system. Of course, there are some reasons behind this strategy. NETRUM uses PoW system in the first blocks, since they are mostly distributed for miners who can win the mining. However, an interesting fact is that Ethereum miners are now shifting from Proof of Work (PoW) to Proof of Stake (PoS).

3.1.1 How PoW Works

PoW is designed to make the digital transactions secured without the need for a third party. Essentially, it requires the blockchain community to solve the puzzles. It is important in verifying the transactions. This is actually the world of mining in crypto world. PoW is a piece of data, which is very costly and hard to produce. However, once it is generated, verification process is easy. The following is how PoW works :

- To create the data, a miner has to solve the puzzles by computing a very complex equation.
- Each equation actually builds on the previous solutions.
- Therefore, every solution verifies the previous process.
- Solving the equation requires new piece of data, which was then added to the existing chain of data.
- Basically, the process starts over and over

The following is an example of PoW in NETRUM Network:

```
#include "pow.h"
#include "chain.h"
#include "chainparams.h"
#include "main.h"
#include "primitives/block.h"
#include "uint256.h"
#include "util.h"
#include <math.h>
unsigned int GetNextWorkRequired(const CBlockIndex* pindexLast,
const CBlockHeader* pblock)
{
/* current difficulty formula, phore - DarkGravity v3, written
by mr.brand - brand@netrum.io */
const CBlockIndex* BlockLastSolved = pindexLast;
const CBlockIndex* BlockReading = pindexLast;
int64_t nActualTimespan = 0;
int64_t LastBlockTime = 0;
int64_t PastBlocksMin = 24;
int64_t PastBlocksMax = 24;
int64_t CountBlocks = 0;
uint256 PastDifficultyAverage;
uint256 PastDifficultyAveragePrev;
if (BlockLastSolved == NULL || BlockLastSolved->nHeight == 0 ||
BlockLastSolved->nHeight < PastBlocksMin) {
 return Params().ProofOfWorkLimit().GetCompact();
}


if (pindexLast->nHeight > Params().LAST_POW_BLOCK()) {
  uint256 bnTargetLimit = (~uint256(0) >> 24);
  int64_t nTargetSpacing = 60;
  int64_t nTargetTimespan = 60 * 40;
  int64_t nActualSpacing = 0;
  if (pindexLast->nHeight != 0)
                nActualSpacing = pindexLast->GetBlockTime() -
pindexLast->pprev->GetBlockTime();

if (nActualSpacing < 0)
    nActualSpacing = 1;
```

```
 // ppcoin: target change every block
 // ppcoin: retarget with exponential moving toward target
spacing
 uint256 bnNew;
 bnNew.SetCompact(pindexLast->nBits);

 int64_t nInterval = nTargetTimespan / nTargetSpacing;
        bnNew *= ((nInterval - 1) * nTargetSpacing + nActualSpacing +
nActualSpacing);
  bnNew /= ((nInterval + 1) * nTargetSpacing);

  if (bnNew <= 0 || bnNew > bnTargetLimit)
  bnNew = bnTargetLimit;

  return bnNew.GetCompact();
 }

 for (unsigned int i = 1; BlockReading && BlockReading->nHeight > 0;
i++) {
  if (PastBlocksMax > 0 && i > PastBlocksMax) {
  break;
  }
  CountBlocks++;

  if (CountBlocks <= PastBlocksMin) {
  if (CountBlocks == 1) {
  PastDifficultyAverage.SetCompact(BlockReading-
>nBits);
 } else {
                PastDifficultyAverage = ((PastDifficultyAveragePrev *
CountBlocks) + (uint256().SetCompact(BlockReading->nBits))) /
(CountBlocks + 1);
            }
  PastDifficultyAveragePrev = PastDifficultyAverage;
 }
if (LastBlockTime > 0) {
            int64_t Diff = (LastBlockTime - BlockReading-
>GetBlockTime());
  nActualTimespan += Diff;
  }
  LastBlockTime = BlockReading->GetBlockTime();

if (BlockReading->pprev == NULL) {
 assert(BlockReading);
 break;
```

```
}
     BlockReading = BlockReading->pprev; }

  uint256 bnNew(PastDifficultyAverage);

    int64_t _nTargetTimespan = CountBlocks *
Params().TargetSpacing();

   if (nActualTimespan < _nTargetTimespan / 3)
       nActualTimespan = _nTargetTimespan / 3;
   if (nActualTimespan > _nTargetTimespan * 3)
       nActualTimespan = _nTargetTimespan * 3;

   // Retarget
   bnNew *= nActualTimespan;
   bnNew /= _nTargetTimespan;

   if (bnNew > Params().ProofOfWorkLimit())
{
    bnNew = Params().ProofOfWorkLimit();
   }

   return bnNew.GetCompact();
}
bool CheckProofOfWork(uint256 hash, unsigned int nBits)
{
   bool fNegative;
   bool fOverflow;
   uint256 bnTarget;
if (Params().SkipProofOfWorkCheck())
      return true;
  bnTarget.SetCompact(nBits, &fNegative, &fOverflow);

  // Check range
    if (fNegative || bnTarget == 0 || fOverflow || bnTarget >
Params().ProofOfWorkLimit())
    return error("CheckProofOfWork() : nBits below minimum
work");

    // Check proof of work matches claimed amount
    // if (hash > bnTarget)
    //     return error("CheckProofOfWork() : hash doesn't match
nBits");
```

```
uint256 GetBlockProof(const CBlockIndex& block)
{
    uint256 bnTarget;
    bool fNegative;
    bool fOverflow;
    bnTarget.SetCompact(block.nBits, &fNegative, &fOverflow);
    if (fNegative || fOverflow || bnTarget == 0)
        return 0;
    // We need to compute 2**256 / (bnTarget+1), but we can't
represent 2**256
    // as it's too large for a uint256. However, as 2**256 is at
least as large
    // as bnTarget+1, it is equal to ((2**256 - bnTarget - 1) /
(bnTarget+1)) + 1,
    // or ~bnTarget / (nTarget+1) + 1.
    return (~bnTarget / (bnTarget + 1)) + 1;}
```

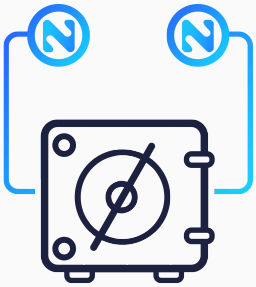
3.1.2 Advantages and Disadvantages of PoW

Proof of Work (PoW) has some advantages, particularly when it comes to reduction of attack risks. It is said to reduce almost 51% of the potential attacks. Other benefits include :

- The verification process becomes easier for the community. Therefore, it is easier to check all of the transactions.
- No third party transactor is necessary, as PoW is built upon a transparent and trustless network.
- PoW determines the limits of the number of blocks that can be generated.

However, PoW also has some disadvantages. It is a labor-intensive process, thus requiring much energy. The work is not more than solving randomized puzzles. Some even say that mining process wastes computer potential and energy. Therefore, Ethereum developers are now shifting to another way of validating transactions, namely Proof of Stake (PoS).

3.2 Proof of Stake (PoS)



PoS algorithm chooses nodes randomly as a validator for the next block. Which is based on the combination of a number of factors; Staking Age, Randomization, and the wealth contained inside a Masternode.

In PoS, miners are called forgers or stakers. It does not provide the miners with 'rewards' for solving mathematical puzzles. In other words, there is no reward in PoS. Instead, nodes are chosen in a deterministic way. The main determinant is wealth, namely stake. In addition, the digital currencies have been created since the beginning. The number never changes. PoS system only aims at selecting the nodes based on their stake.

Actually, why does Ethereum community want to switch from PoW to PoS? The following are some reasons:

- PoW needs a lot of energy. PoW works based on a distributed consensus. Imagine that a single Bitcoin transaction consumes energy as much as the energy consumed by 1.57 households in America for a single day. The trend keeps increasing when PoW system remains a dominant practice.

- Pressure upon the digital currency value. The energy consumed by PoW is paid in fiat currencies. This leads to constant pressure on the value of digital currency. If PoW system is kept, digital currencies will lose their appeals.

- PoS is greener and cheaper. It also works based on a distributed consensus, but it consumes less energy. PoS is expected to solve the issues associated but it consumes less energy. PoS is expected to solve the issues associated with energy scarcity in the future due to crypto mining process. It is environmentally friendly since the forging process requires less electricity and

fewer hardware costs.

- PoS is more promising. In PoW, there is no guarantee that miners own the digital currency, which they are mining. In PoS, Masternodes are always owners of coins created.

3.2.1 How PoS Works

In PoW, miners are selected based on their ability to solve the mathematical puzzles. But, how are nodes selected in PoS? The following are some details on how PoS works:

- Casper. This is a new concencus protocol for PoS. If it is implemented, there will be a validator pool. Candidate nodes can join the pool for forger selection. The process will happen through a function of calling Casper contracts. Then, Ether (coin that powers the Ethereum network) will be sent together with Casper Contract.

- PoS algorithms select the nodes in an arbitrary way as a validator for the next block. Actually, selection of the nodes is based upon several factors, mainly, stakes, randomization, and wealth owned by the nodes. In the case of NETRUM, the nodes are called Masternodes.

- In PoS, blocks are mined, instead of mined. The coins in PoS usually begin with selling of PRE MINED Coins, or minted coins. Alternatively, the coins may be originally created with PoW system. Then, when the target coins are reached, the system shifts to PoS. In NETRUM case, the first 1000 blocks are created by means of PoW system.

- Users, who want to become Masternodes, are required to lock certain number of coins (stake) to be used in the network. The more the STAKES are required to lock certain number of coin (stake to be used in the network. The more STAKES

are the higher the probability that Masternode will be selected as the next validator. Shortly, the process prioritizes the wealthiest nodes in the network.

There are two methods of selecting VALIDATOR NODES. They are randomized block selection and Coin Age Selection.

3.2.1.1 Randomized Block Selection Method (Pseudo-Random)

In this method, blocks are selected based on the combination of the lowest hash value and the highest-stake owners. Since the STAKE size is open to public in the network, the next validator is easy to guess. That is why, this selection method is also called Pseudo-Random. It is not purely random, since the nodes in the network can easily see who will become the next validator.

3.2.1.2 Coin Age Selection Method

In this method, the nodes are selected based on the oldest stake. It is decided by means of the following formula :

Coin Age = Number of Days x Number of Coin

Number of days shows how long the coins have been kept as stakes. Normally, a coin age must be at least 30 days to qualify for competition. The longer the coins are staked, the greater the chances for being selected to forge the next block. After a node is selected, the system will reset the day into zero (0 day). They have to wait anothr 30 days to qualify for the next selection. Between these times, other coins will join the competition. This helps preventing the wealthiest STAKER to dominate the selection over and over. Otherwise, the same node will always become the validator. This is not fair for the other nodes, right?

Actually, every cryptocurrency has its own regulations as well as different

needs. However, what does a NODE actually do in the network? Check them out below :

- When a NODE is selected as a validator, he/she will have to validate each transaction, sign the block, and release it into the blockchain network.
- A validator works for a maximum period of 90 days. Then, he/she has to quit. Another validator will do the job after the same competition.
- A NODE gets transaction fees as a validator.
- When a NODE wants to quit as a validator, he/she can release the STAKING coin into the network. Then, the network can decide a time to see whether there are fraudulent blocks added into the blockchain network or not.
- The network will then decide a time to select the next validator. Practically, the same process repeats over and over.

The following is an example of PoS in NETRUM network:

```
CBlockIndex* AddToBlockIndex(const CBlock& block)
{
    // Check for duplicate
    uint256 hash = block.GetHash();
    BlockMap::iterator it = mapBlockIndex.find(hash);
    if (it != mapBlockIndex.end())
        return it->second;
// Construct new block index object
    CBlockIndex* pindexNew = new CBlockIndex(block);
    assert(pindexNew);
     // We assign the sequence id to blocks only when the full data
is available,
     // to avoid miners withholding blocks but broadcasting headers,
to get a
    // competitive advantage.
    pindexNew->nSequenceId = 0;
      BlockMap::iterator mi = mapBlockIndex.insert(make_pair(hash,
pindexNew)).first;
```

```
 //mark as PoS seen
    if (pindexNew->IsProofOfStake())
    setStakeSeen.insert(make_pair(pindexNew->prevoutStake,pindexNew->nStakeTime));
pindexNew->phashBlock = &((*mi).first);
    BlockMap::iterator miPrev = mapBlockIndex.find(block.hashPrevBlock);
    if (miPrev != mapBlockIndex.end()) {
     pindexNew->pprev = (*miPrev).second;
     pindexNew->nHeight = pindexNew->pprev->nHeight + 1;
        pindexNew->BuildSkip();
//update previous block pointer
     pindexNew->pprev->pnext = pindexNew;

     // ppcoin: compute chain trust score
     pindexNew->bnChainTrust = (pindexNew->pprev ? pindexNew->pprev->bnChainTrust : 0) + pindexNew->GetBlockTrust();

// ppcoin: compute stake entropy bit for stake modifier
     if (!pindexNew->SetStakeEntropyBit(pindexNew->GetStakeEntropyBit()))
            LogPrintf("AddToBlockIndex() : SetStakeEntropyBit() failed \n");

     // ppcoin: record proof-of-stake hash value
     if (pindexNew->IsProofOfStake()) {
            if (!mapProofOfStake.count(hash))
                LogPrintf("AddToBlockIndex() : hashProofOfStake not found in map \n");
          pindexNew->hashProofOfStake = mapProofOfStake[hash];
     }

     // ppcoin: compute stake modifier
     uint64_t nStakeModifier = 0;
     bool fGeneratedStakeModifier = false;
        if (!ComputeNextStakeModifier(pindexNew->pprev, nStakeModifier, fGeneratedStakeModifier))
            LogPrintf("AddToBlockIndex() : ComputeNextStakeModifier() failed \n");
        pindexNew->SetStakeModifier(nStakeModifier, fGeneratedStakeModifier);
        pindexNew->nStakeModifierChecksum = GetStakeModifierChecksum(pindexNew);
        if (!CheckStakeModifierCheckpoints(pindexNew->nHeight, pindexNew->nStakeModifierChecksum))
```

```
    LogPrintf("AddToBlockIndex() : Rejected by stake modifier
checkpoint height=%d, modifier=%s \n", pindexNew->nHeight,
std::to_string(nStakeModifier));
    }
    pindexNew->nChainWork = (pindexNew->pprev ? pindexNew->pprev-
>nChainWork : 0) + GetBlockProof(*pindexNew);
    pindexNew->RaiseValidity(BLOCK_VALID_TREE);
    if (pindexBestHeader == NULL || pindexBestHeader->nChainWork <
pindexNew->nChainWork)
        pindexBestHeader = pindexNew;
    //update previous block pointer
    if (pindexNew->nHeight)
        pindexNew->pprev->pnext = pindexNew;
    setDirtyBlockIndex.insert(pindexNew);

    return pindexNew;
}
```

3.3 MASTERNODE

Masternode is a computer node in 1 IP Address or a Crypto Wallet that stores the Blockchain copy from the first Block to the most recent. To get rewards, the Masternode computer has to store certain quantity of coin part and must be run 24 hours a day, 7 days a week non stop.

The Masternode is simply defined as a server in a decentralized network. It runs unique functions, which ordinary nodes cannot. That is why they it is called “Master.” The unique functions are mainly doing direct send, instant transactions, and private transactions.

Actually, how masternode functions varies from a network to another. Every cryptocurrency has its own pros and cons. The payout and reward systems vary widely. For instance, some cryptocurrency provide rewards to masternode operator up to multiple times a day. Meanwhile, some others only pay them the masternodes out once a day.

Most nodes are competing to become masternodes. Why? They actually get some benefits, including earning free digital money. They need less expensive investment to participate and provide service to a crypto network. Actually, any users (nodes) can run Masternodes. However, they need to meet certain criteria to qualify. The requirements may vary from a cryptocurrency to another. In NETRUM, for instance, any nodes need to keep 2,000 NTR coins as collateral to qualify for Masternodes. The Masternodes must be running 24 hours a day, 7 days a week.

Actually, the Masternodes are not standalone. Instead, they are communicating each other throughout the systems. Owners of Masternode participate in securing the NETRUM network by means of the following process :

- Validating all of the transactions that have the right 'signatures' for all of the outputs produced
- The transactions must be in the right data format
- Preventing 'double spending' or 'double transaction'
- All outputs of the transactions are validated
- Executing instant send and private transactions
- Ensuring that all nodes in the blockchain comply with the regulations (in the network)

3.3.1 Who Can Run a Masternode

As the name suggests, Masternodes are more than ordinary nodes are. They are usually supported by heavier equipment and system compared to normal nodes. Besides validating, saving, and broadcasting transactions in the systems, They

sometimes do other functions in the blockchain network, depending upon the requirements. For instance, they may govern voting events, execute protocol operations, and make sure that all nodes in the blockchain comply with the existing regulations within the system.

Therefore, the Masternodes must be always active. They need more memory than normal nodes do. Masternodes are just like large serves in compyrer network. Due to nature of the functions, Masternodes consume more electricity, more storage space, more time for maintenance, and more memory. That is why the Masternodes are rewarded by the system. In NETRUM blockchain, a Masternode needs to meet the following criteria :

- Operator Masternode (owner)
- Collateral, or coins that serve to guarantee that Masternodes do not do anything that can ruin the system, such as malicious things like hacking
- The server used for decentralized infrastructure in NETRUM network

3.3.2 Collateral

Anyone can be a Masternode. However, since a Masternode plays a crucial role in validating the transactions and securing the network, the system needs to make sure that a Masternode does not do malicious things as well as cheating and corrupting the system. Therefore, the operator needs to save TOL as collateral, which is locked while a Masternode is still active. In NETRUM, a Masternode will have to provide 2000 NTR coins as collateral. The coins cannot be used for transaction.

Then, when the system detects something malicious from the Masternode (for instance, a Masternode approves an invalid transaction, DDoS, or s o on), the

Masternode (for instance, a Masternode approves an invalid transaction, DDoS, or so on), the collateral will be frozen and the Masternode is expelled from the network. In other words, a Masternode has to be honest in working as a validator. Otherwise, he/she will lose 2000 NTR coins for nothing. Of course, the collateral system has definite advantages, including :

- Minimizing the risk of cheating and corruption by a masternode
- Ensuring that the masternodes do their best as validators
- Making sure that the system runs well and fairly, and many more

3.3.3 Masternode Server

As mentioned above, a server used for decentralized infrastructure can also serve as a Masternode. A Masternode Server needs to meet the following general criteria:

	Minimum	Recomended
CPU	1x1Ghz	1x2 Ghz
RAM	2GB	4GB
HDD	20GB	40GB
NETWORK	400GB/mth	1TB/mth
Static IP address or Unique IP Address (1 node = 1 IP address)		

For smoother operation, it is recommended that a Masternode Server user specifications above than the standard.

3.3.4 Masternode Reward

As explained above, a Masternode works to validate all the transactions in the network, sign the new block, and add it into the network. For all things a Masternode does, he/she deserves rewards. They include the following :

- Transaction fees from all of the transactions validated in a correct and timely way by the Masternode.
- Incentives from the reserved NETRUM coins

4 Netrum Features

NETRUM blockchain offers some advantages in comparison with other blockchains, as it is designed to solve most of the problems associated with the existing blockchains. The following is the summary of NETRUM Features In Comparison With Other Blockchain Systems :

	Netrum	Bitcoin	Ethereum	EOS	Cardano	Dash
Interchain Support	No	No	Yes	No	Yes	No
Transaction Per Second	143	4	8	500	10	48
Code Base Language	C++	C++	C++	WebAssembly	Haskel	C++
Energy Consumtion	Low	High	High	Low	Low	High
Instant Send	Yes	No	No	No	No	Yes
Masternode	Yes	No	No	No	No	Yes
Proof of Work	Yes	Yes	Yes	No	No	Yes
Proof Of Stake	Yes	No	No	Yes	Yes	No

Transaction speed

When Bitcoin can only execute 4 transactions per second, NETRUM is able to execute up to 143 transactions per second. Of the five blockchains compared above, NETRUM ranks the second, after EOS, when it comes to transaction speed per second.

Low energy Consumption

Since NETRUM applies the combination of PoW and PoS system, it is operated in a more cost-effective way. This is particularly true for level of energy consumption.

Of the 5 blockchains compared, NETRUM is in line with EOS and Cardano in terms of energy consumption.

Instant Send

Few blockchains offer “Instant Send” services. NETRUM is one of them. This feature allows the nodes to send and receive transactions instantly – no delays and no downtime.

Masternodes

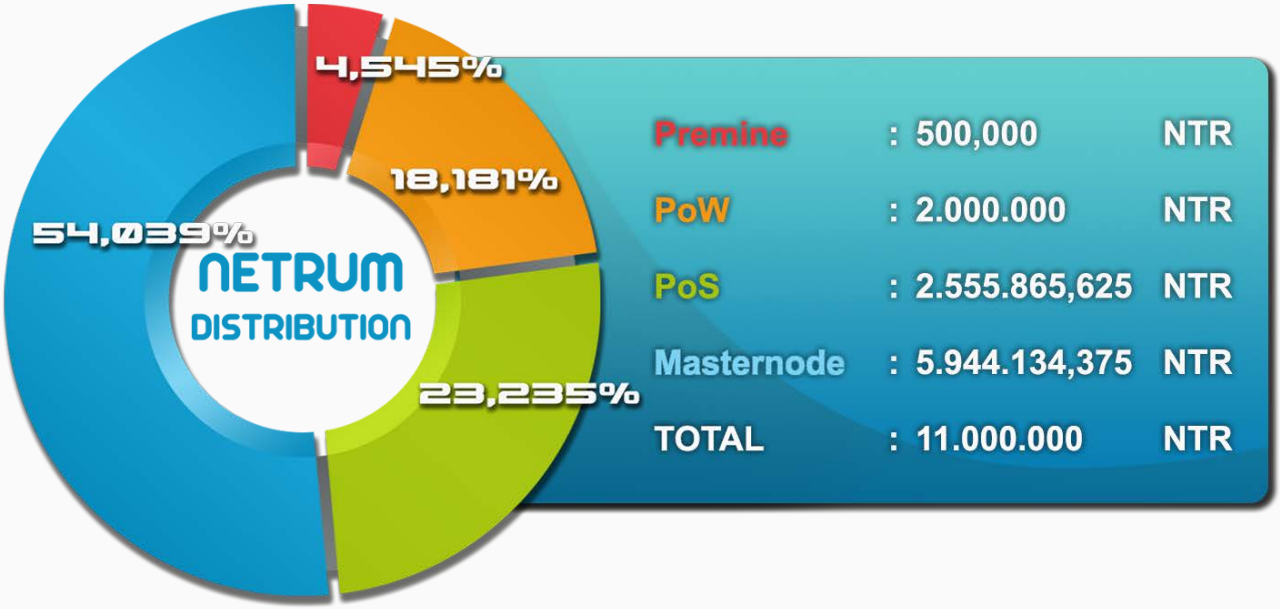
The masternodes perform additional functions, which are not available from normal nodes. They include performing instant send, as mentioned above. Masternodes as available in NETRUM increases security and dependability of the blokchain. While the masternodes enjoy incentives from their functions, they have to provide collateral to make sure that they do not cheat or corrupt the system.

5 Coin Metric

5.1 NETRUM Coin Spec

Coin Name	:	Netrum
Ticker Name	:	NTR
Algoritm	:	X11 PoW - PoS - MN
Max Supply	:	11.000.000 NTR
Block Time	:	12 Second
Masternodes	:	2000 NTR
Premine	:	500.000 NTR
Block Size	:	2 MB
Coin Maturity	:	5 Block
RPC Port	:	19778
P2P Port	:	19777
Min Input Age	:	120
Min Confirm	:	1 Confirms

5.2 Coin Distribution



As displayed above, a total of 11,000,000 NTR Coins will be available from NETRUM. They are released for different phases, from the Premine to the Masternode phases. The graph below shows that most of the coins will be allocated for Masternodes, followed by PoS phase, PoW phases, and Premine. Why? Masternodes and PoS are essentially the distinguishing features of NETRUM

5.3 PoW Reward Breakdown

In NETRUM, Proof of Work (PoW) system is implemented since block 1 to the first 50,000 blocks. It means that NETRUM still invites miners to create new blocks in the network. NETRUM limits the blocks to be created up to 50,000 blocks. Then, the system will run based upon Proof of Stake (PoS) system.

For every block, there are 40 reward coins. Therefore, the total reward blocks in the NETRUM PoW systems are 2,000,000 NTR coins. Actually, PoW system provides a chance for miners with small balance in their wallet to get free coin.

They may not qualify for PoS since the balance is low, but PoW system enables them to increase their stakes.

This number can be seen the following calculation :

Start Block	End Block	Total Block	Block Reward	Total Reward	PoW	PoS	Master node
1	50.000	50.000	40	2.000.000	40	0	0

5.4 PoS Phase Reward Breakdown

PoS reward is actually a kind of passive incomes for users. Users who own a coin just need to stake certain amount of digital coins on the network. They cannot be spent during the staking process. Wallets with staked coins are selected to validate the action of creating a new block. The selected wallets are rewarded with NTR coins. The more coins you stake in the wallet, the higher the opportunities for being selected as a validator.

NETRUM allocates about 23,24% of its total coin supply for PoS phase. It offers a total of 2,555,865.625 NTR Coins as rewards. The rewards are given at graded level, as seen in the following table. The table implies that NETRUM rewards the first users who join the staking process with higher reward rate. The sooner you participate, the higher the reward rewards you can enjoy. Still, this is another way of inviting early users to join the blockchain.

For instance, NETRUM rewards a rate of 0.4 (40%) for users who join the first 50,000 blocks in PoS phase (after PoW phase ends). Then, the reward rate decreases to 17.5% (0.175) for the next 20,000 blocks, and so on.

Start Block	End Block	Total Block	Block Reward	Total Reward
50.001	100.000	50.000	0,4	20.000
100.001	120.000	20.000	0,175	3.500
120.001	140.000	20.000	0,0085	1.700
140.001	150.000	30.000	0,4125	1237,5
170.001	200.000	30.000	0,02	600
200.001	250.000	50.000	0,096875	484,375
250.001	539.380.000	539.380.000	0,0046875	2.528.343,75

5.5 Masternode Phase Reward Breakdown

NETRUM appreciates the efforts made by the Masternodes to validate the transactions and to secure the systems. Therefore, it allocates more than half of the total coin supply for Masternodes, namely 54,04% of the total 11,000,000 NTR coins. This shows that NETRUM prioritizes credibility and security of the platforms. Any nodes can qualify as masternodes, as long as they meet the requirements.

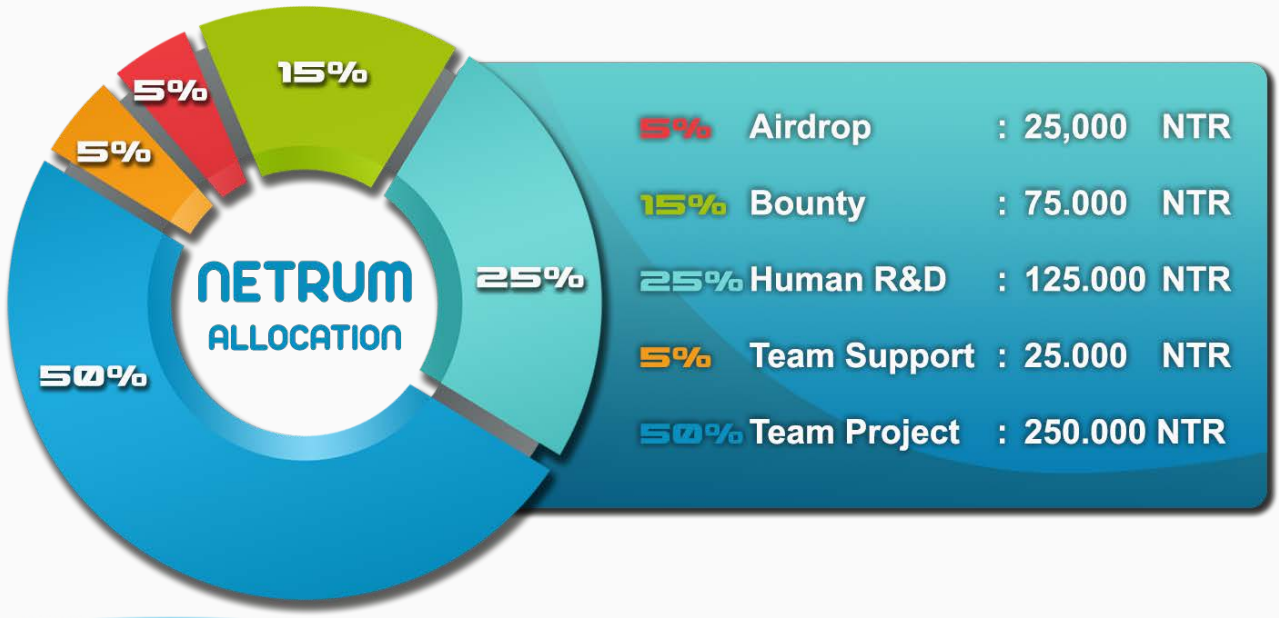
Of course, qualifying for a Masternode can be a challenging thing. This can be a source of headache for majority of nodes. You need technical knowledge on computer system and language and capability to follow complicated guidelines. These are actually apart of the general requirements like collateral, a server or VPS (Virtual Private Server), a dedicated IP address, and storage space, which is enough to save the copies of transactions in the Blockchain. Therefore, make sure to learn about computer systems to increase your chance for becoming the masternode. The following is breakdown of the reward for Masternodes:

Start Block	End Block	Total Block	Block Reward	Total Reward
50.001	100.000	50.000	0,6	30.000
100.001	120.000	20.000	0,325	6.500
120.001	140.000	20.000	0,165	3.300
140.001	150.000	30.000	0,08375	2.512,5
170.001	200.000	30.000	0,0425	1.275
200.001	250.000	50.000	0,0215625	1.078
250.001	539.380.000	539.380.000	0,0109375	5.899.468,75

5.6 PREMINE

Premine is a condition, in which supply of new currency has been created before it is officially released. In this phase, developer of the new cryptocurrency may allocate certain amount of coins for particular purposes before releasing the source code to the public.

As displayed above, a total of 500,000 NETRUM coins are allocated for PREMINE. They will be allocated for airdrops and bounty, research and development, team support, and team project.The following is detail on how the 500.000 NTR coins will be used:



1) Airdrops

NETRUM allocates 25,000 NTR coins for airdrops during the Premine phase. Yes, NETRUM is a new cryptocurrency blockchain. Therefore, we still need some efforts to invite new users and increase its popularity. Basically, the chances for getting free NTR coins depend upon how active the users are. We distribute free coins for users who meet certain criteria, for instance:

- First subscribers

  We rewards first users who join the network with free coins. This is virtually free of requirements. However, we will set the limit of coins to be offered for first subscribers

- Joining our group in Telegram

  We will create a forum, where users can communicate each other and shares knowledge and experience about NETRUM. You can get free coins only by joining the forum.

- Promoting NETRUM on social media

  Use your social media account productively to earn free coins. Promote NETRUM and increase your chances for getting NTR coins for free.

- Inviting other users to join NETRUM, and many more

  This works like an affiliate marketing system, but in different ways. Invite your friends and relatives to join NETRUM, and get free coins for any reference. Tell us your referrent users, and we will send the coins to your NETRUM wallet.

2) Bounty

This is actually the next phase after Airdrops. However, the mechanism is mostly similar. Free coins are offered for users after accomplishing certain tasks. This is another reward system in premine phase. Bounty generally aims at spreading awareness about NETRUM blockchain by means of several tools.

We invite users to join Bounty programs by creating positive buzzes about NETRUM in the following ways :

- Social media campaigns

  You need to promote NETRUM on your social media accounts like Facebook, Instagram, YouTube channels, Twitter, and other sites. We implement a certain system to determine your engagement levels in social media campaigns. The criteria may include number of likes, shares, comments, subscriptions, views, or re-tweets.

- Article Writing

  If you love writing, get a chance to get free NTR coins by writing article post on NETRUM. This is a great chance for bloggers or online writers. Post article on NETRUM on your blogs or web pages, and your chance to get free coins depends upon the level of engagement.

NETRUM allocates 75,000 NTR coins for those who want to participate in Bounty programs. Grab them!

3) Human Resource and Development

Of course, development of a new cryptocurrency blockchain depends much upon the human resource behind the project. In addition, we need to do comprehensive research on the existing platforms to be able to develop a better one. We need some resources to study the advantages and disadvantages of the existing blockchains.

As there are more and more cryptocurrencies in circulation, the competition is tighter now. We need to make sure that the new blockchain has more advantages and unique values, which are not available from any other blockchains. Our teams may need specific training about the computer system and crypto world. A total of 125,000 NTR coins will be allocated for this purpose.

4) Team Support

We have some teams that work hand in hand to develop the NETRUM project. This certainly requires substantial financial resources. A total of 25,000 NTR coins will be allocated for team support.

5) Team Project

Project development is the core of PREMINE phase. Therefore, NETRUM allocated half of the PREMINE coins for this purpose. The money will be used for developing basic platform, features of the new blockchain, testing phase, security system, integration, and many more.

5.7 Static Coin Supply

A total supply of NETRUM coins is 11,000,000. The number will remain the same. There will be no additions or reductions, since NETRUM has a static coin supply. Static coin supply means that the supply of money is limited. The maximal supply cannot be increased beyond the defined protocol. This cannot be manipulated by anyone, even by the system.

Static coin supply offers the nodes with some advantages. Since the supply is static, while more nodes join the network, the value of NTR Coins will tend to increase with time. Basically, value of a crypto coin depends upon supply and demand principle. When the demand is high, while the supply is limited, the value will increase. This is what makes NETRUM applies a static coin supply

The coin supply is limited to 11,000,000. Meanwhile, NETRUM is designed to be used for different purposes. It will serve as a payment system for shopping, financial institutions, traveling services, and many more. When it is globally accepted as a payment tool, while the supply is scarce, you can imagine how the value will raise substantially.

6 Netrum Wallet

In cryptocurrency, you do not own an account just you do in conventional banking system. Instead, you have a cryptocurrency wallet. It is simply defined as a software program to store private and public keys to enable the users to send or receive digital currency as well as monitoring their balance. Anytime you use a cryptocurrency, ownership of a digital wallet is a must.

However, do not imagine traditional pocket wallets, where you store certain amount of money. It is true that cryptocurrency wallet stores your money, but not in physical meaning. In fact, no single location stores your currency. The digital wallet only records the transactions stored on the blockchain. For instance, when you receive money from someone, it is stored into your wallet, but in the forms of digital records. On the other hand, when you send certain amount of money to someone the balance in your digital wallet decreases.

NETRUM offers three types of wallets, which are always existent in the Blockchain cryptocurrency. They are :

- Web Wallet and/or Paper Wallet, called NETWEB
- Hot Wallet, which is used for daily transactions, namely, mobile apps called NETMOBILE
- Cold Storage / Hardware Wallet, called NETCARD

6.1 NETWEB

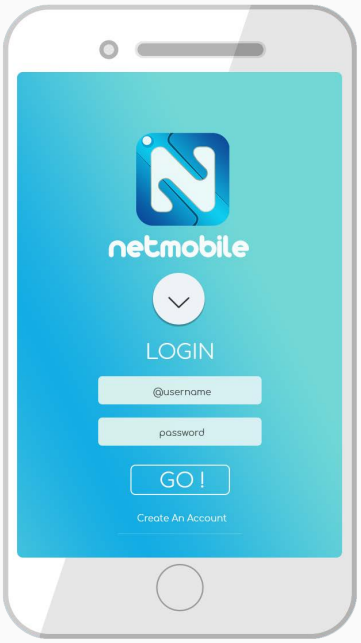
Web Wallet in NETRUM is a key component of NETRUM software. Just like any other desktop wallets, you need to download and install the wallet into your PC or laptop.

The wallet can be accessed only from the same computer of laptop. Desktop wallet is actually a safer form of digital wallet, if you use the computer or laptop personally at home.

In NETRUM, the desktop wallet is called NETWEB. It functions like METAMASK in Ethereum network. However, NETWEB comes with more user-friendly features. It is easy to manage, even by beginners. NETWEB is also present in the form of paper wallet. It is a piece of software used to generate a pair of keys. Then, the keys are printed.

However, there is still some risks associated with desktop wallet. When your computer or laptop is hacked (while it is connected to internet) or when your PC or laptop is attacked by virus, you may lose all of your funds, should you fail to gain access to the digital wallet. Therefore, make sure that the PC or laptop that stores your desktop wallet is properly maintained and protected.

6.2 NETMOBILE



NETRUM also offers Mobile Apps Wallet. This is the result of cellular app development for the mobile users. This type of wallet enables the users to manage their wallet right from their mobile phone. It means that they can manage it anytime and anywhere. This is expected to enhance convenience and comfort in managing the wallet. Hot wallet is accessible from any device, as long as it is connected to internet.

The cellular app is designed with all features owned by desktop wallet. The difference is that the users can bring the wallet anywhere, unlike desktop wallet that is static at home or at the office. The cellular apps power the use of NETRUM as a digital currency in the real world. This solves the current problem with most of the cryptocurrencies. Few of them have cellular apps, while users are mostly mobile.

It is impossible to use digital currency to pay for goods or services in real world, if you can only manage your digital assets using desktop at home, right?

When NETRUM is accepted by merchants throughout the world, it will need a portable payment system. Here is where cellular app works. The mobile apps allow the users to check the transactions and NETRUM balance anytime. We realize that all the NETRUM users are busy people. Therefore, we offer a convenient wallet management system to allow the users manage the account right at their hands.

In Indonesia, NETMOBILE will allow transactions in Rupiah, as regulated by BANK INDONESIA. However, Blockchain NETRUM will be included in the app.

This is good news for NETRUM users in Indonesia. The apps will be localized to facilitate the users in managing their account without any language barriers.

Again, NETMOBILE is not free of risks. As the keys are stored online, your risks depend upon the security systems you install into your gadgets. The risks associated with mobile wallet include:

- Losing your mobile number used for NETMOBILE
- Losing your phone
- Attackers getting access into your email account
- Attackers hijacking your accounts

When one of those risks happen, you can totally lose the money stored in the hot wallet. Since the wallet is always connected to internet, the risks are even higher. Therefore, experts of cryptocurrency recommend storing only small amount of money in your hot wallet. Keep a balance, which is enough for daily transactions.

6.3 NETCARD

NETCARD is a hardware wallet offered by NETRUM. The wallet serves as a cold storage for long term. The wallet works really in offline system, thus increasing security. It minimizes the risk for hackers getting into the wallet and stealing the balance. Of the three types of digital wallet, this is the safest one. Even though you make transactions online, they are stored offline.

Hardware wallets require you to store the private keys on a physical device, like a USB. Actually, the hardware wallet can be connected to internet, but only for transaction purposes. You can easily transact online, why the money is kept offline. Hardware wallets require you to store the private keys on a physical

device, like a USB. Actually, the hardware wallet can be connected to internet, but only for transaction purposes. You can easily transact online, why the money is kept offline. This minimizes the risk of danger, since the hackers cannot get access into offline wallets. This is the choice if you want to store large amount of money.

Is NETCARD fully free of risks? The answer is NO. There is still a risk of losing the private keys and failing to access your wallet. This is a form of human error, but the results can be so dramatic. Shortly, every type of digital wallet has its own pros and cons. Therefore, make sure to minimize the risks of losing your money by doing the following tips :

- Backing up your wallet

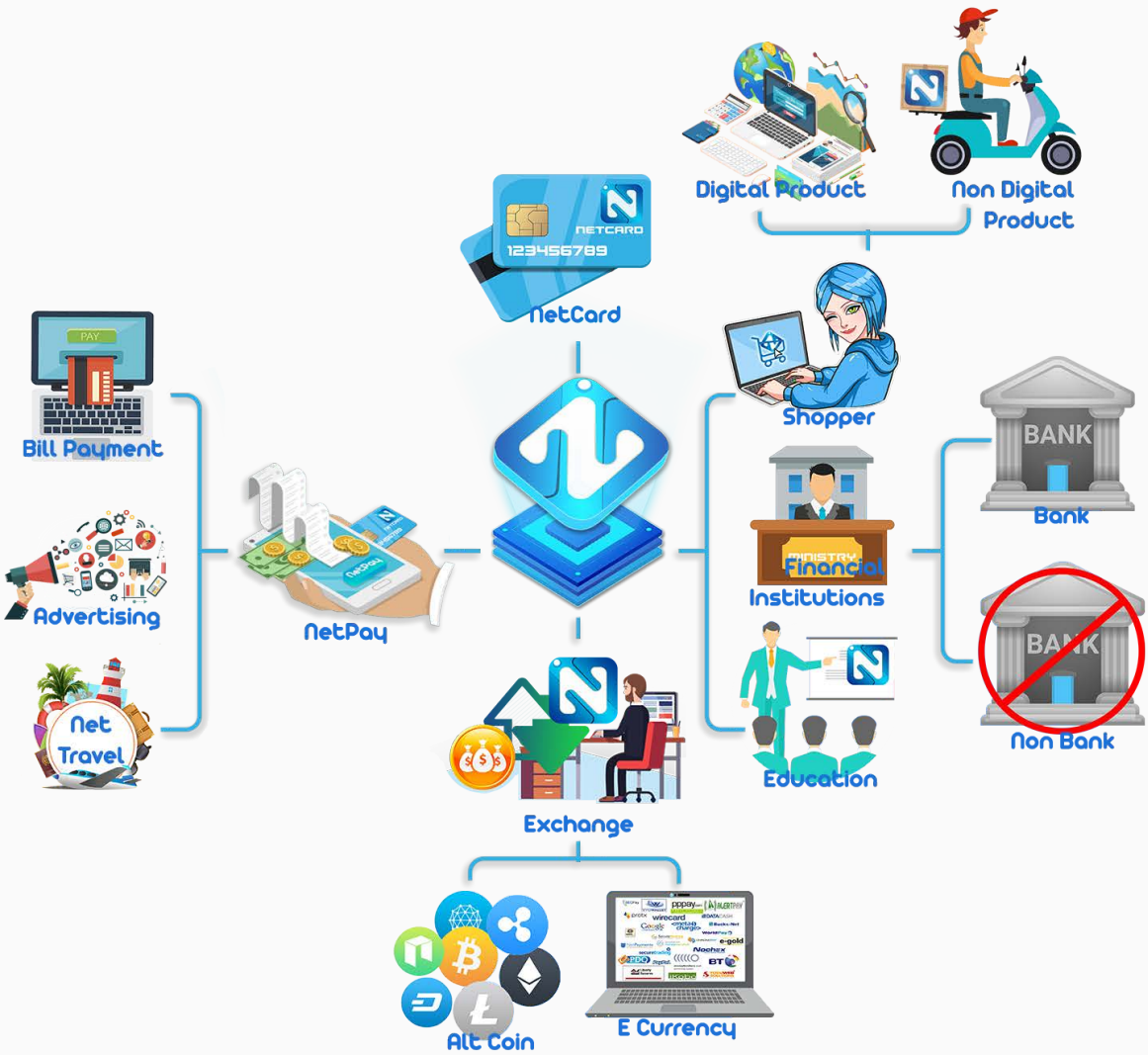
  As discussed above, keep only small amount of digital currency in online or hot wallet, web wallet, or desktop wallet. Keep the rest in a more secured environment, namely cold wallet. A paper wallet, hard storage like USB, and external hard disk are among the options. Make sure to have the backup. Should your PC or laptop fail, you can recover the wallet then.
- Updating Software

  Keep the software up to date, including security software. Therefore, your wallet will benefit from the updated features. Regular updates are necessary for not only the wallet software, but also the software on your PC, laptop, or mobile phone.
- Adding Extra Security

  Never depend upon a single security. The more layers the security is, the safer your wallets will be. You may use a long, complex password to minimize the risks of hackers getting access into your wallet. If you use a mobile wallet, make sure to install extra protection in your mobile phone. For instance, you can install a fingerprint authentication app on your mobile phone.

This another advantage offered by NETRUM. We apply extra-security layers such as two-factor authentication (2FA) to enhance security of the digital wallets. We also apply multi-sign system for extra security. The only challenge with extra-security layer is to avoid losing your private keys.

7 Use of NETRUM



Use of Blockchain-based NETRUM provides the users with a number of advantages. They include scalability, high-speed transaction, and better security compared to Bitcoin and Ethereum. However, those are not the only objectives of NETRUM Blockchain development. Instead, we aim at offering a new ecosystem solution by using the latest technology, along with all of its functionalities.

Using Blockchain platforms and smart contracts allows NETRUM users to develop new projects based on tokens that operate upon NETRUM Blockchain. We call this special application as Decentralized Applications or Dapps. NETRUM offers a comprehensive solution for cryptocurrency owners, who want to use their coins in conventional business environment. Digital currency has limited use when accessibility and usages are limited.

Right now, cryptocurrencies are used in limited sectors, such as domain purchase and gaming. It is still far away from essential domains like health and education. Therefore, NETRUM will come with a number of services, which will make it closer to the community. They include the following :

- Education
- Debit Cards
- Processing for regular payment, shopping, bill payments, and Ads
- Payment for Netravel
- Payment for Multi-financial institutions, including banks and non-bank institutions

7.1 Education

Education is the most important element in the development of human resources. Blockchain is expected to affect the education system greatly. The effects come in various forms.

For instance, blockchain allows educators and students to communicate through online platforms while payments can be made with digital money. It is likely that many education facilities or online tutors will receive fees in cryptocurrencies.

Actually, some notable universities across the globe receive payment in digital money. However, the concept is different when it comes to human resource development. NETRUM will provide a platform, which allows educators and students to communicate and provide different learning experiences, while the tutors get money.

Therefore, NETRUM will come with a number of convenient services to make transactions in education sector much easier. These will apply for offline and online education services. For these, NETRUM will collaborate with many educational institutions across the globe.

7.2 Crypto Debit Cards

Many people around the world prefer using debit cards for making payments. Unlike credit card, which is actually another form of debt, debit card uses the balance in your account. NETRUM contingency plan includes development crypto debit cards, which will become a viable option of payment across the globe. When it is made real, the users can make payment in digital money as conveniently as using the conventional debit cards.

7.3 Regular Payment

It must be noted that technology has brought about significant impacts upon human life. Technology affects how people meet their needs for goods & service.

More and more people are shifting from conventional shopping system by visiting the markets or brick-and-mortal stores to digital (online) shopping systems. A number of local and global marketplaces are ready to provide the consumers with anything they need. Therefore, the consumers now can buy anything they need anytime and anywhere, right from their hands.

This trend also applies in Indonesia. E-commerce grows fast. In 2015, more than 18 millions of consumers in Indonesia used online marketplace. This shows an increasing trend every year. It was estimated that by 2020, more than 119 millions of consumers would have used online shopping system to meet their needs. This optimism certainly comes with reasons, including :

- Huge population
- Fast penetration of mobile gadgets, thanks to the low prices
- Fast investment growth
- Development of payment infrastructure that allows the consumers to shop online without using bank accounts
- Fast economic growth, which promotes the development in all economic sectors, including buying capability. Better economic conditions also affect consumption patterns of the people.

As a result, Indonesia people are more familiar with e-commerce shopping system. This is evident from the increasing search and more specific keywords used in internet browsers. Moreover, Indonesia has a number of e-commerce with good reputations. The country also has some reputable shipping agents, both private owned and government owned agencies.

Given these facts, NETRUM will facilitate the shopper to buy physical things like fashion items, beauty products, electronics, and many more, or digital products like domain, security SSL, domain, cloud serves, and many more, from online stores.

7.4 NETPAY

NETPAY is an internet-based payment system. It serves as an intermediary facility. Nowadays, many startups facilitate sellers and buyers by offering security guarantee for e-commerce transactions. To ensure the transaction security NETRUM will serve as an intermediary by establishing a blockchain based database to make sure that NETPAY works safely, fast, and practically.

By using NETPAY, sellers and buyers will enjoy a number of benefits, including:

- Simple transaction system. It will apply in a universal way as long as buyers and sellers are from the same country
- Improved transaction security, compared to cash and bank transfer systems.
- More efficient and simpler time and employee management.

For the first phases, we will prioritize the use of NETPAY for the following services:

- Bill payment, such gas, electricity, cable TV, and water bills
- Advertising, such as splash ads, slide ads, and broadcast ads
- NetTravel, such as purchases of airline tickers, train tickets, and hotel reservation.

7.5 Financial Institutions

One of the most potential target markets in Indonesia is local cooperatives, wich have hundreds of thousands or even millions of members across the nation. Cooperative is a strong base of local economy in Indonesia. It is built from the grassroots, thus building the foundation of economy from the bottom and minimizing the impacts of external shocks.

The good news is that ecosystem of the economy and internal transactions are well established in cooperative systems. Some local cooperatives even have mobile e-commerce apps and internal marketplaces. Yes, the cooperative system in Indonesia grows well. Therefore, NETRUM will be easily integrated into the system, thus eliminating the need for -3rd-party in between, namely banking system. The results will be more efficient transactions and zero bank fees. In the end, the cooperatives will be able to operate in a more efficient and effective system.

NETRUM will develop NETRUM-based tokens. The cooperatives will increase the demand for NTR coins. Therefore, the NTR values will increase with time. However, the system will not leave the banks at all. Instead, NETRUM and banks will be integrated via Visa/Master Card that is necessary for NETCARD.

Besides cooperatives and banks, NETRUM will integrate with health insurance services. Health insurance is a basic need for people in Indonesia. A number of insurance companies, either owned by private agencies or owned by the government, operate in Indonesia. They become potential partners of NETRUM.

8 Conclusion

NETRUM offers some features of its users. Connecting NETRUM with financial systems is hassle-free. The essence of NETRUM system is 'customer-oriented." We keep building and developing the platform by offering new features that benefit the users. NETRUM is "the Future of Technology", which is universal, practical, and hassle-free to use. The platform will keep growing to make sure that the users feel comfortable in using it.

With the philosophy of "the Future of Technology", NETRUM team keeps working to generate the next NETRUM Platform. The system will come with revolutionary, simple, and comfortable features. The customers, who use the platform, will be able to convert their digital wealth in an instant way. They can save, trade, and exchange the NTR coins with Bitcoin or Altcoin directly. These only some of the advantages offered by NETRUM.

NETRUM ROADMAP

Q1 2020
- Release DAPP
- Release Smart Contract

Q4 2019
- Release Netcard Hardwallet

Q3 2019
- Android Netmobile Release
- IOS Netmobile Release
- Payment Gateway API for Developer

Q2 2019
- Website Launch
- Blockchain Release
- Netweb Release
- Airdrop Program Start
- Bounty Program Start
- Whitepaper Release
- Listing First Exchange

Q1 2019
- Team Extension
- Blockchain Development
- Coin Explorer Development

Our Team

Agung Suwito
Chief Executive Officer

Muhammad Reza
Chief Operating Officer

Dony Mulyana
Chief Technology Officer

Andika Muhammad P
Chief Financial Officer

Ida Bagus Windu S
Chief Marketing Officer

Anjar Budi Kustanto
Advisor

Eka Suwandana
Advisor

DISCLAIMER

1. This document has the solely purpose of describing and illustrating technical development of NETRUM as a project and describing targets set by the development team. The introduction and description of the basic conditions of the project in this document serve as an invitation to the general public.
2. The information provided on this document does not constitute in any way an investment advice, financial advice, trading advice, or any other sort of advice, and you should not treat any of the content as such.
3. Nothing on this document should be taken as an offer to buy any digital asset. Do conduct your own due diligence and consult your financial advisory before making any investment decision. NETRUM will not be held responsible for the investment decisions you make based on the information provided on this technical document.
4. Those who have the intention to participate, invest, and cooperate in this project must clearly understand the full risks of this project, that is not and cannot be regarded as an investment or declaration of commitment to any specific or unspecified subject, is not a commitment nor a guarantee of accomplishment of all described development targets.
5. The digital asset "NETRUM" or "NTR" referred on this project, has a complete and independent value separate from the project team. The trading behavior on different digital assets trading platform, market environment and the degree of acceptance of market entities will determine and change the value of Netrum as digital asset. This value is determined by the recognition of the value and exchange value of the relevant market participants.
6. Digital assets markets could have larger price volatility caused by unstable policies on blockchains in countries and regions around the world. It is common for prices to face drastic fluctuations and value of your holdings could increase or decrease by over 100% in a single day. Although this could mean potential huge profits, this also could mean potential huge losses. The team cannot guarantee the value of Netrum as digital asset over time , also the ROI of masternodes can depend upon several conditions and cannot be considered as a guarantee of financial return.
7. Netrum as digital assets cannot be regarded as bonds or any form of securities, nor is it a project team's, company's equity, shares, ownership or control. For this reason, you should DO NOT INVEST ALL YOUR MONEY IN ANY DIGITAL ASSETS. Only invest money which you are willing to lose.
8. Cryptocurrency trading may not be suitable for all users of this website. Anyone looking to invest in cryptocurrencies should consult a fully qualified independent professional financial adviser. Netrum team and the project itself faces many risks, including but not limited to the world economy and environment, blockchain development, corporate operations, and other unpredictable events that could happen anytime or force the project to terminate development operations.
9. The project team cannot and will not be liable for any loss or damage caused by your own actions, you are the solely responsible of your digital holdings and custody of your private keys.
10. The project team also cannot guarantee the storage, retrieval, and modification of the relevant virtual property of your digital assets. You are the solely responsible of holding Netrum in trading exchange or digital asset portfolio, also those provided by the team, represents an understanding and willingness to accept its risks.
11. In view of changes in the ongoing regulation of blockchain technology, cryptocurrency or intangible assets by governments around the world, Kalkulus team reserves all rights to modify, delete, add, revoke, abrogate, and interpret related behaviors of some or all of the contents of this document at any time, in accordance with the laws regulations, and actual conditions of each region.
12. You confirm that you are free to judge the content of the project team and the project services, and bear all risks arising from the use of the contents of this document, including the risks arising from the reliance on the correctness, completeness or practicality of the contents of this document.