

# NKN Economic Model and Road Map



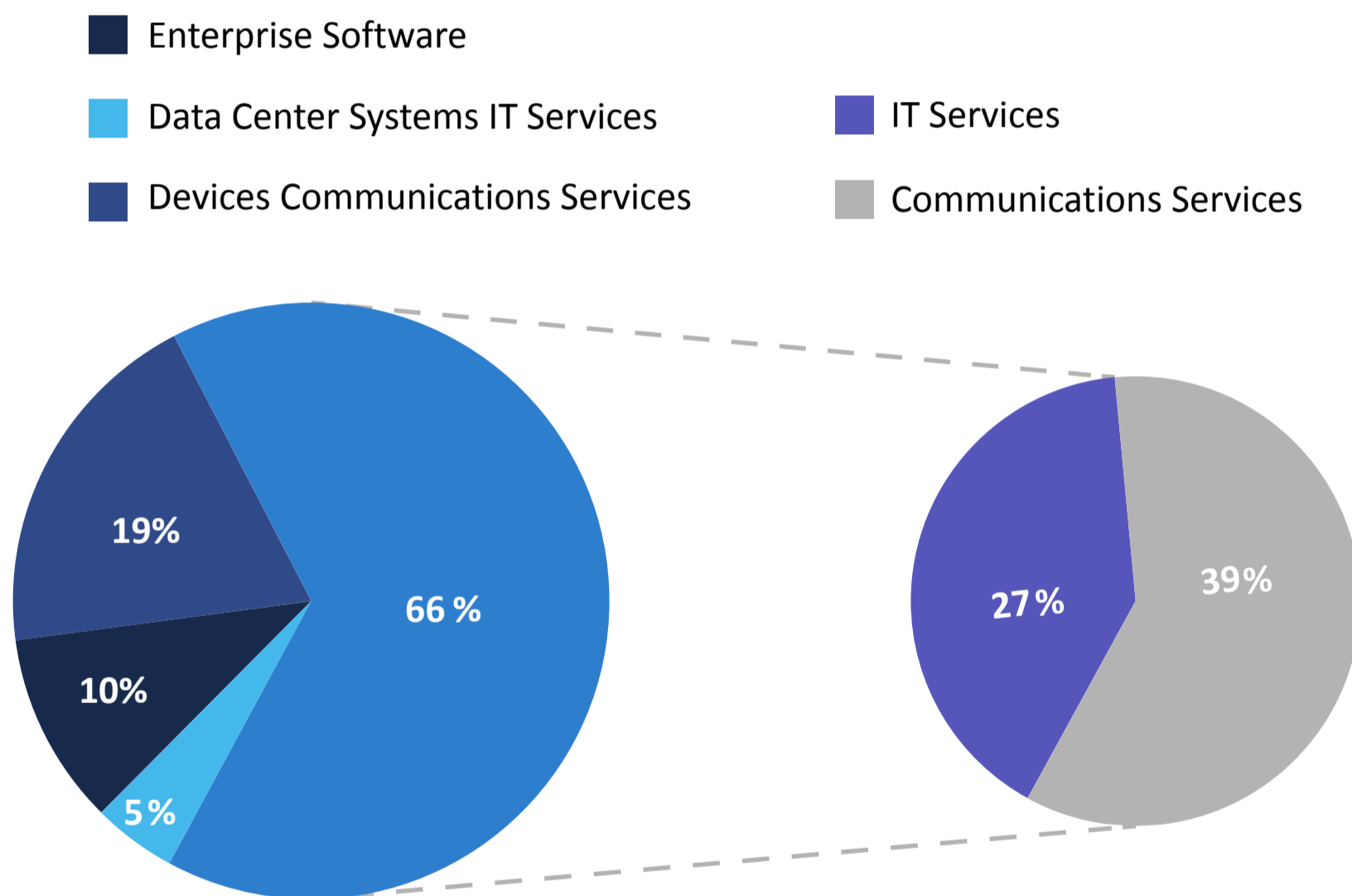
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NKN Team | April 2018

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## Introduction

According to Gartner's report [1], global IT spending is going to reach \$3.7 trillion in 2018, among which communications/network services continue to drive most of the spending. The \$1.4 trillion-dollar communication service business shows a huge potential when NKN incorporates it with blockchain technology.



**Figure 1** Pie chart of worldwide IT spending share forecast in 2018, data source from Gartner forecast [1], indicating communications service takes the lion share of IT market.

NKN (New Kind of Network) is the new generation of highly scalable, self-evolving and self-incentivised, decentralised network. By applying blockchain technology to the third pillar of the Internet infrastructure, NKN revolutionises the blockchain ecosystem by innovating on the network layer, after Bitcoin [2]/Ethereum [3] applied blockchain technology to computing power as well as IPFS [4]/Filecoin [5] applied blockchain technology to storage.

NKN is a decentralised data transmission and connectivity network with its native digital cryptographically-secured utility token, NKN. NKN introduces self-incentivised sharing mechanism to ensure the continued validity of resource sharing. Clients spend NKN to transmit data, and relay nodes get NKN through relaying data for clients as well as by contributing to the expansion and sharing of the network connectivity and transmission capacity.

In addition, miners receive NKN rewards for system contributions. NKN encourages individuals or organisations at each transmission node to contribute or share idle network resources through awarding NKN. This promotes the construction of a new mode of data resource transmission and ensures the continuity of network transmission resource sharing.

Resources are required for the provision of network connectivity, transmission capacity, thus nkn would provide the economic incentive for the provision of these consumed resources. nkn is an integral and indispensable part of NKN, because in the absence of nkn, there would be no economic incentive for participants to provide these resources, thus rendering the ecosystem on NKN unsustainable.

nkn is designed to achieve fairness between sharing the network transmission resources and receiving the rewards. Our methodology is verifiable, transparent, and backed by mathematics. nkn is the foundation of the NKN ecosystem. nkn distribution is limited and the amount of mining output declines linearly over time. It becomes increasingly difficult to acquire nkn over time. Specifically, the production mechanism of nkn is divided into two parts: the first part is created at genesis; the second part is obtained by miners through mining.

## Main Features

### Strategic revamp of network layer

After years of evolution, blockchain application in computing and storage has been thoroughly explored and recognised by more and more people. Yet, there is a lack of breakthrough in fundamental research in blockchain.

NKN introduces strategic innovation into the network layer of the blockchain system. It sets network connectivity and transmission capacity as the core resources to be tokenised and thus shared, while Proof of Relay becomes a new type of "Proof of Work". Furthermore, NKN introduces Cellular Automata [6,7] into the network layer to create self-evolving network topology.

NKN solves the existing challenges in blockchain networks, such as scalability of the network, lack of peer equality and extensibility. By using Cellular Automata to improve the efficiency of blockchain, NKN will achieve peer equality of all nodes in the network.

Being complementary to decentralised computing power (Bitcoin [2]/Ethereum [3]) and decentralised storage (IPFS/Filecoin [4,5]), NKN primarily focuses on network connectivity and data transmission. NKN makes peer-to-peer networks more reliable and secure, enabling healthier and safer networking layers.

### Tokenisation of network connectivity and data transmission capability

In addition to innovating the blockchain network layer, NKN proposes to tokenise network connectivity and data transmission capability. The new economic model will encourage participants to share their connectivity, bandwidth to fully leverage their idle network resources to achieve productive resource sharing. Hence, improving the utilisation of network resources and enhancing network transmission capacity. nkn is a major component of the ecosystem on NKN, and is designed to be used solely on the network. nkn has the following characteristics:

### 1 Proof of utility

Token utility can be verified at the time of creation. Self-incentivised native nkn is a non-refundable functional utility token which will be used as the unit of exchange between participants in the NKN ecosystem, which compensates network resource sharing such as connectivity and data transmission capability.

### 2 Fungibility

nkn can be exchanged freely within the NKN network and can be traded and exchanged between participants in the NKN ecosystem.

### 3 Privacy

nkn is innately anonymous, with authenticity and tamper-proof guaranteed by cryptography. Additionally, nkn is backed and safeguarded by mathematics.

The sharing mechanism based on network connectivity and data transmission capability is the backbone of the NKN project that will span through the entire project's design.

It can be said that the sharing mechanism based on the connectivity and data transmission capability of the network layer is not just a general outline of the entire project, but also a guiding instruction for specific details within the project's design. Enabling it leads to future development of blockchain technology.

## Economic Model

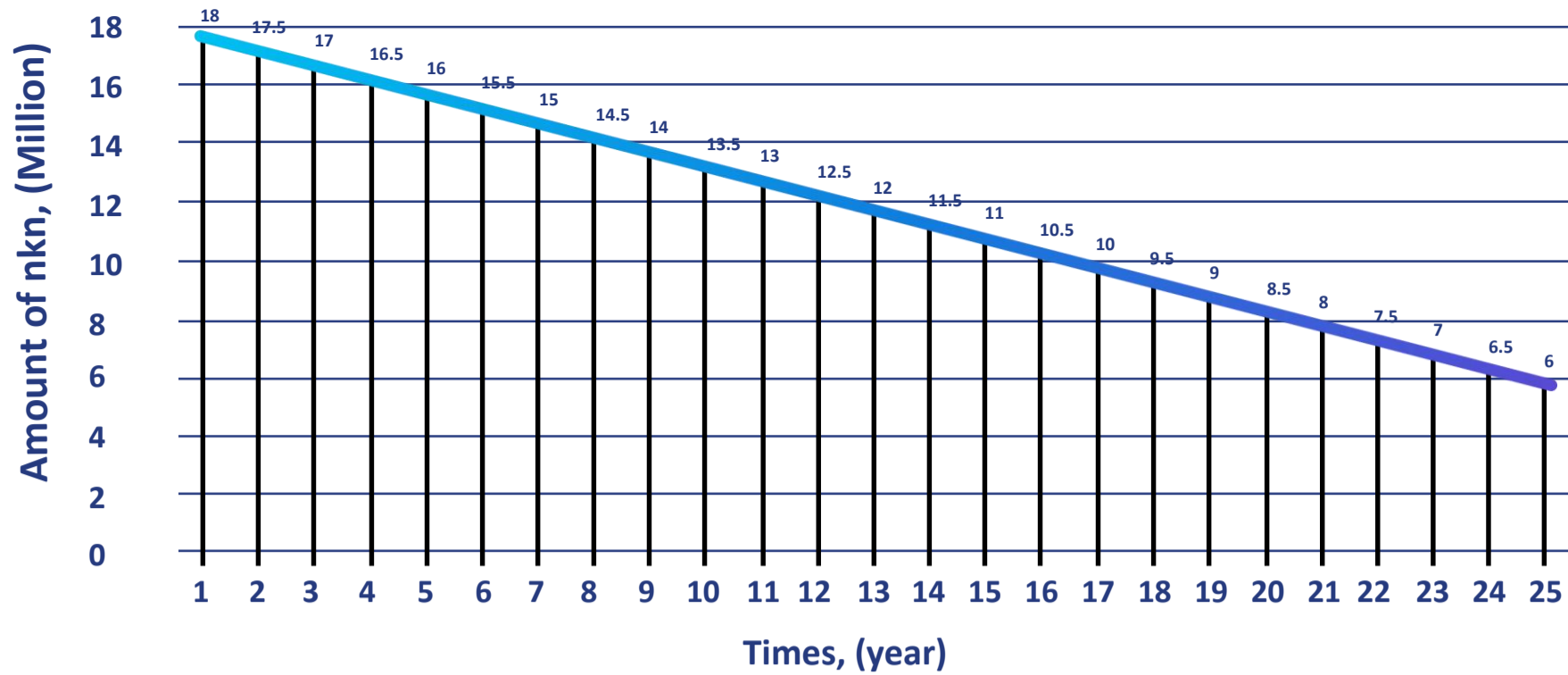
nkn does not in any way represent any shareholding, participation, right, title, or interest in NKN Foundation Ltd. (the **Foundation**), its affiliates, or any other company, enterprise or undertaking, nor will nkn entitle token holders to any promise of fees, revenue, profits or investment returns, and are not intended to constitute securities in Singapore or any relevant jurisdiction. nkn may only be utilised on NKN, and ownership of nkn carries no rights, express or implied, other than the right to use nkn as a means to enable usage of and interaction with NKN. In particular, you understand and accept that nkn:

- (a) does not represent or confer on the token holder any right of any form with respect to the Foundation (or any of its affiliates) or its revenues or assets, including without limitation any right to receive future revenue, shares, ownership right or stake, share or security, any voting, distribution, redemption, liquidation, proprietary (including all forms of intellectual property), or other financial or legal rights or equivalent rights, or intellectual property rights or any other form of participation in or relating to NKN, the Foundation, the Distributor and/or their service providers;
- (b) is non-refundable and cannot be exchanged for cash (or its equivalent value in any other virtual currency) or any payment obligation by the Foundation or any affiliate;
- (c) is not intended to be a representation of money (including electronic money), security, commodity, bond, debt instrument or any other kind of financial instrument or investment;
- (d) is not a loan to the Foundation or any of its affiliates, is not intended to represent a debt owed by the Foundation or any of its affiliates, and there is no expectation of profit; and
- (e) does not provide the token holder with any ownership or other interest in the Foundation or any of its affiliates. The total quantity of nkn released will be one billion. In the beginning of the system operation, 70% nkn will be generated.

The remaining 30% will be generated by transmission network mining after the mainnet is launched, which will take place over a period of 25 years in declining quantities. The annual supply quantity of nkn produced (Q), in unit of millions, is distributed based on the time variable "T", which can be mined in accordance with the formula below:

$$Q_{nkn} = 18.5 - 0.5T, 1 \leq T \leq 25$$

Total amount of nkn is limited and mining output declines linearly with time. This incentivises early participation in the NKN network. The cost of nkn is determined by the bid between the client and the miner (similar to Ethereum system fee); therefore, changes in the market price for nkn will not affect the equivalent price of transaction or relay fees.



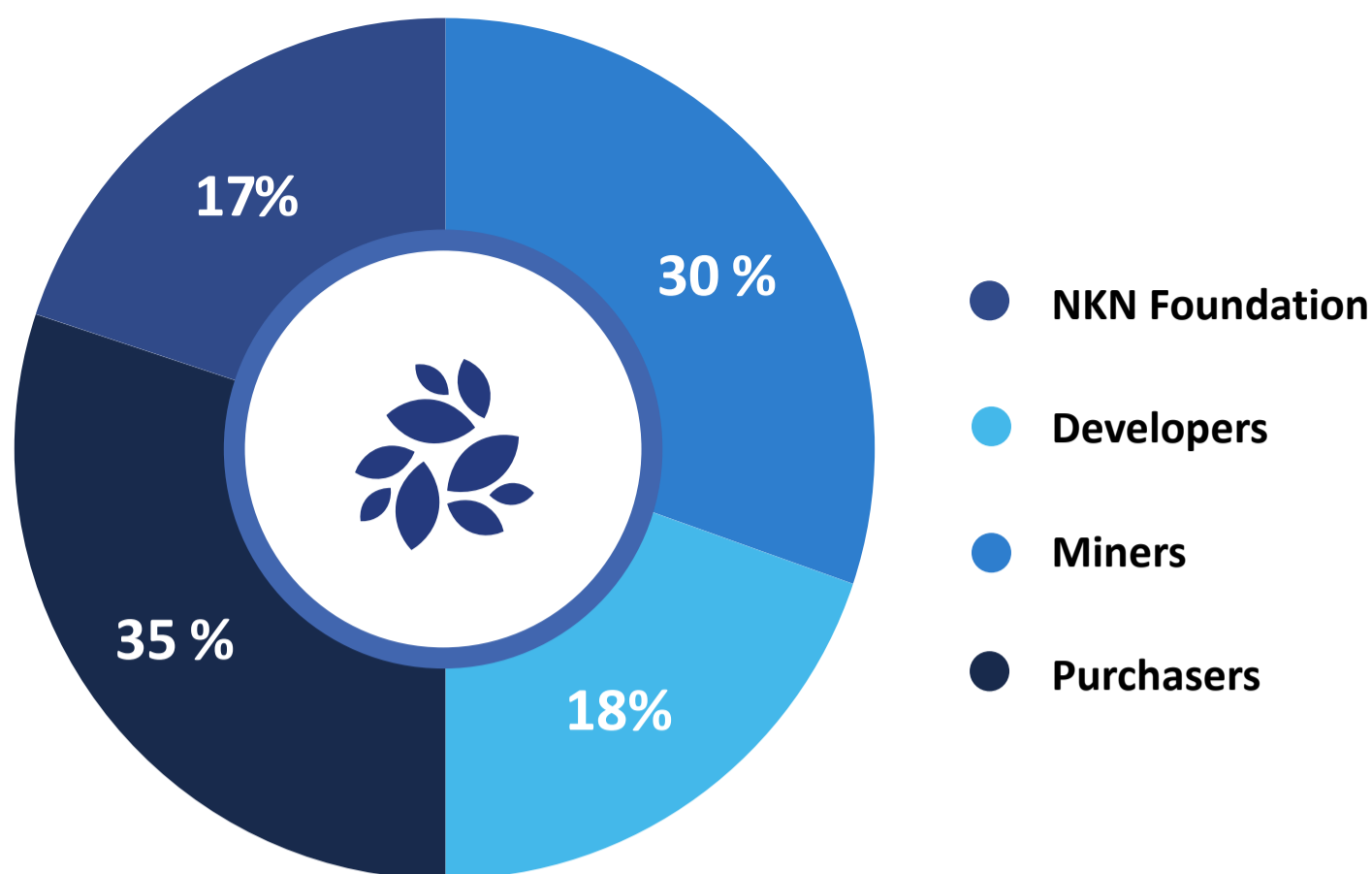
**Figure 2** nkn annual mining amount supply curves versus time.

The smallest unit in NKN is Qi, where  $1 \text{ Qi} = 10^{-24} \text{ nkn}$ . A series of units are defined between Qi and nkn for convenience, as shown in Table 1. Qi will be used for micropayment to meet the ever-expanding data transmission demands.

**Table 1.** Unit prefix of nkn finite division for circulation and micropayment.

$10^0$	<b>nkn (NKN token)</b>
$10^{-3}$	<b>ZQi (Zetta-Qi)</b>
$10^{-6}$	<b>EQi (Exa-Qi)</b>
$10^{-9}$	<b>PQi (Peta-Qi)</b>
$10^{-12}$	<b>TQi (Tera-Qi)</b>
$10^{-15}$	<b>GQi (Giga-Qi)</b>
$10^{-18}$	<b>MQi (Mega-Qi)</b>
$10^{-21}$	<b>KQi (Kilo-Qi)</b>
$10^{-24}$	<b>Qi</b>

Implementation of such unit metrics enables highly accurate micropayments on NKN's platform. It should be noted that the actual usage of the above nkn unit prefixes is dependent upon the degree of NKN's network development. Optimal unit prefix can be selected for usage based on the demand of network development in connectivity, capability, and data transmission. The allocation of nkn is shown in **Figure 3**.



**Figure 3** Allocation of nkn percentage.

35% (350 million) of the total amount is made available to purchasers; 18% (180 million) of the total amount is reserved for developers and advisors and transferred to them over a 3-year period; 17% (170 million) of the total amount is reserved for the Foundation for building the NKN community and network; the remaining 30% (300 million) will be generated through "mining" over an estimated 25-year period. Each newly generated block will generate fresh nkn as an incentive for miners per the stated rule specified above.

nkn is based on blockchain technology to ensure that the data of consumption and sharing contributions cannot be falsified. Through a decentralised ledger, it ensures that all records are valid and transparent.

nkn is also the driving force in NKN's ecosystem and an influential factor in cultivating a healthy and stable ecosystem. Exchanges and rewards of nkn drive users to share their network resources or even upgrade their hardware, thus enhancing the whole network capacity. NKN users can use nkn to exchange network resources, embracing the era of enhanced network connectivity and data transmission capability.

Pricing of transmission capacity of nodes in the NKN network will be directly negotiated between service providers and clients.

## nkn Distribution Metrics

We want to take time to explain the numbers around nkn distribution. We hope that this will clear up any confusions surrounding the upcoming nkn token sale. The distributor of nkn (the **Distributor**) shall be an affiliate of the Foundation.

## Token Supply and Sale

- The overall amount of NKN will be fixed at 1 billion.
- 35% of NKN token will be offered to purchasers.



The contributions in the token sale will be held by the Distributor (or its affiliate) after the token sale, and contributors will have no economic or legal right over or beneficial interest in these contributions or the assets of that entity after the token sale. To the extent a secondary market or exchange for trading NKN does develop, it would be run and operated wholly independently of NKN Foundation, the Distributor. Neither the Foundation nor the Distributor will create such secondary markets nor will either entity act as an exchange for NKN.

## Developers & Advisors

- 18% of NKN will be reserved for developers and advisors, and will be transferred to them over a 3-year period. Upon the expiry of 1 year, the team will receive 1/3 of this allocation, with a further 1/3 of this allocation to be distributed upon the expiry of each year thereafter, until the 3-year period is up.

## Foundation Reserve

- The 17% reserved for the Foundation will be used for referral programs, incentives, and marketing initiatives aimed to promote the user base. The Foundation will also cover for expenditures in areas of legal and consulting services, strategic initiatives, operational overheads, dApp ecosystem support, and expansion of the NKN network infrastructure. The Board of Directors of the Foundation is tasked with managing the use of resources for the development of NKN for the best benefit of all users, participants and stakeholders, including operation management, market promotion, development of underlying technology and construction of service system, planning and technology development.

## Miner

- 30% of NKN will be awarded to miners once the MainNet is live online.

## Roadmap

### 2017 Q 4

- Released NKN's blockchain community forum with incentives for technical communication

### 2018 Q 1

- Release whitepaper
- Publish economic model and roadmap
- Publish introduction of team members and advisers
- Develop NKN blockchain

### 2018 Q2 ~ Q 4

- Develop NKN blockchain
- Develop NKN ecosystem in parallel

### 2019 Q1 ~ Q 2

- Launch NKN TestNet
- Release NKN ecosystem applications

- ◆ Launch NKN MainNet
- ◆ Launch NKN ecosystem

## Disclaimers and Risks

This document is intended for distribution to a selective community of audiences, and may not be copied, reproduced, distributed or disseminated in any way without the prior written consent of the Foundation.

You acknowledge and agree that there are numerous risks associated with purchasing NKN, holding NKN, and using NKN for participation in NKN:

### 1. Uncertain Regulations and Enforcement Actions

The regulatory status of NKN and distributed ledger technology is unclear or unsettled in many jurisdictions. The regulation of virtual currencies has become a primary target of regulation in all major countries in the world. It is impossible to predict how, when or whether regulatory agencies may apply existing regulations or create new regulations with respect to such technology and its applications, including NKN token and/or NKN. Regulatory actions could negatively impact NKN token and/or NKN in various ways. The Foundation (or its affiliates) may cease operations in a jurisdiction in the event that regulatory actions, or changes to law or regulation, make it illegal to operate in such jurisdiction, or commercially undesirable to obtain the necessary regulatory approval(s) to operate in such jurisdiction.

After consulting with a wide range of legal advisors and continuous analysis of the development and legal structure of virtual currencies, the Foundation will apply a cautious approach towards the sale of NKN. Therefore, for the crowdsale, the Foundation may constantly adjust the sale strategy in order to avoid relevant legal risks as much as possible. For the crowdsale, the Foundation is working with Tzedek Law LLC, a boutique corporate law firm in Singapore with a good reputation in the blockchain space.

### 2. Inadequate disclosure of information

As at the date hereof, NKN is still under development and its design concepts, consensus mechanisms, algorithms, codes, and other technical details and parameters may be constantly and frequently updated and changed. Although this white paper contains the most current information relating to NKN, it is not absolutely complete and may still be adjusted and updated by the NKN team from time to time. The NKN team has no ability and obligation to keep holders of NKN informed of every detail (including development progress and expected milestones) regarding the project to develop NKN, hence insufficient information disclosure is inevitable and reasonable.

### 3. Competitors

Various types of decentralised applications are emerging at a rapid rate, and the industry is increasingly competitive. It is possible that alternative networks could be established that utilise the same or similar code and protocol underlying NKN and/or NKN and attempt to re-create similar facilities. NKN may be required to compete with these alternative networks, which could negatively impact NKN and/or NKN.

### 4. Loss of Talent

The development of NKN depends on the continued co-operation of the existing technical team and expert consultants, who are highly knowledgeable and experienced in their respective sectors. The loss of any member may adversely affect NKN or its future development. Further, stability and cohesion within the team is critical to the overall development of NKN. There is the possibility that conflict within the team and/or departure of core personnel may occur, resulting in negative influence on the project in the future.

### 5. Failure to develop

There is the risk that the development of NKN will not be executed or implemented as planned, for a variety of reasons, including without limitation the event of a decline in the prices of any digital asset, virtual currency or NKN, unforeseen technical difficulties, and shortage of development funds for activities.

### 6. Security weaknesses

Hackers or other malicious groups or organisations may attempt to interfere with NKN and/or NKN in a variety of ways, including, but not limited to, malware attacks, denial of service attacks, consensus-based attacks, Sybil attacks, smurfing and spoofing. Furthermore, there is a risk that a third party or a member of the Foundation or its affiliates may intentionally or unintentionally introduce weaknesses into the core infrastructure of NKN token and/or NKN, which could negatively affect NKN token and/or NKN.

Further, the future of cryptography and security innovations are highly unpredictable and advances in cryptography, or technical advances (including without limitation development of quantum computing), could present unknown risks to NKN token and/or NKN by rendering ineffective the cryptographic consensus mechanism that underpins that blockchain protocol.

## 7. Other risks

In addition to the aforementioned risks, there are other risks (as more particularly set out in the Terms and Conditions) associated with your purchase, holding and use of NKN, including those that the Foundation cannot anticipate. Such risks may further materialise as unanticipated variations or combinations of the aforementioned risks. You should conduct full due diligence on the Foundation, its affiliates and the NKN team, as well as understand the overall framework and vision for NKN prior to purchasing NKN token.

Further information upon request at: [contact@nkn.org](mailto:contact@nkn.org)

NKN official channels:

🌐 Official Website: <https://www.nkn.org>

📠 Telegram Community: <https://t.me/nknorg>

📘 Facebook: <https://www.facebook.com/newkindofnetwork/>

🐦 Twitter: [https://twitter.com/NKN\\_ORG](https://twitter.com/NKN_ORG)

## References

- [1] Gartner Inc., "Gartner Says Global IT Spending to Reach \$3.7 Trillion in 2018," Gartner Press, Oct 2017.
- [2] Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System," 2009.
- [3] Vitalik Buterin, "Ethereum White Paper: a Next Generation Smart Contract & Decentralised Application," 2013.
- [4] Juan Benet, "IPFS - Content Addressed, Versioned, P2P File System," Jul 2014.
- [5] Protocol Labs, "Filecoin: A Decentralised Storage Network," Aug, 2017.
- [6] Wolfram, Stephen, "Statistical Mechanics of Cellular Automata," *Reviews of Modern Physics*. 55(3): 601-644., 1983.
- [7] Wolfram, Stephen, "A New Kind of Science", Wolfram Media, 2002.
- [8] Cook, Matthew, "Universality in Elementary Cellular Automata," *Complex Systems*. 15 (1)., 2004.