

GlottoChain

: Transparent Global Real-time
Lottery Platform

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Abstract

Current significant problems in the lottery market are:

- 1) Opacity
- 2) Complexity in the prize collection process
- 3) High-level governmental interference results in lower prize margin
- 4) Difference in currency based on country and service platforms
- 5) Time-consuming balancing process

GlottoChain offers a lottery platform with the highest level of transparency based on the blockchain technology. GlottoChain initially blocks any kind of fabrication or mal intended intervention by recording purchasing history, specific entries, winning numbers, and winners in the distributed ledgers. Furthermore, it is possible to be paid within 20 seconds after the winner announcement if the global lottery service is successfully actualized on the GlottoChain mainnet.

It is also highly viable to create a prize pool that exceeds *Powerball* and *Mega Millions*, two of the largest lottery brands in the U.S., by connecting users from all over the world. Even though there are leading lotteries in every country, users will always choose the one with the largest prize pool. For instance, when *Mega Million's* first prize hit 1.6 billion USD in 2018, there was a massive surge in China's international direct purchases of the specific lottery.

One of the most significant factors in the token ecosystem is securing the number of on-chain service users. To that end, launching a global lottery purchasing agent (LPA) platform should be the first stage. At this stage, the platform helps global users purchase international lotteries that are either government or official organization approved, prize payout collection, and currency exchange. The first round token sales profit will fully support the LPA operations.

Once the user-pool is secured in the initial stage, the draw-circulation can be accelerated with 4/20 and 6/45 Lotto services on the GlottoChain itself. These particular services are expected to attract customers who are particularly interested in low-risk instant lotteries. GlottoChain's 6/45 Lotto draws twice a day. Even shorter term will be provided by 4/20 Lotto that draws every two hours, and eventually, Ladder Race Lotto that draws every five minutes will be offered.

GlottoChain's ultimate goal is to provide all lottery, sports bets, and online casino services. With the ease of currency transfer and faultless security, GlottoChain's currency Glotto Coin (GLTT) can be used in a broad spectrum of markets including casinos, and gaming services. Many cryptocurrency projects have failed to successfully provide payment platforms because there was no real-world service that would be fully linked to the cryptocurrency payment system. GlottoChain, on the other hand, is highly anticipated to deliver the result with its absolute advantage of the ease of securely acquiring new users and gradual platform expansion.

Although the lottery business possesses transnational demand, each country has its restrictions and regulations, making it difficult to have a unified global lottery system. Blockchain, however, can provide a trustworthy multinational platform with its unique immutability and transparency. Lack of traditional investment options has hindered the growth of the online gambling market, and the GlottoChain project can be an adequate answer to this problem by providing a legitimate means of investment and participation. This makes the platform a substantial ICO candidate that meets the original intention of the ICO.

1. Cryptocurrencies Today

1.1. Current cryptocurrency market

For the past few years, especially since 2017, the cryptocurrency market has shown aggressive growth. In December 2017, the global cryptocurrency market size exceeded 500 billion USD. According to Blockchain.info, over 35 million people used any kind of blockchain wallet globally in 2019, and the number eclipsed 50 million in July 2020.

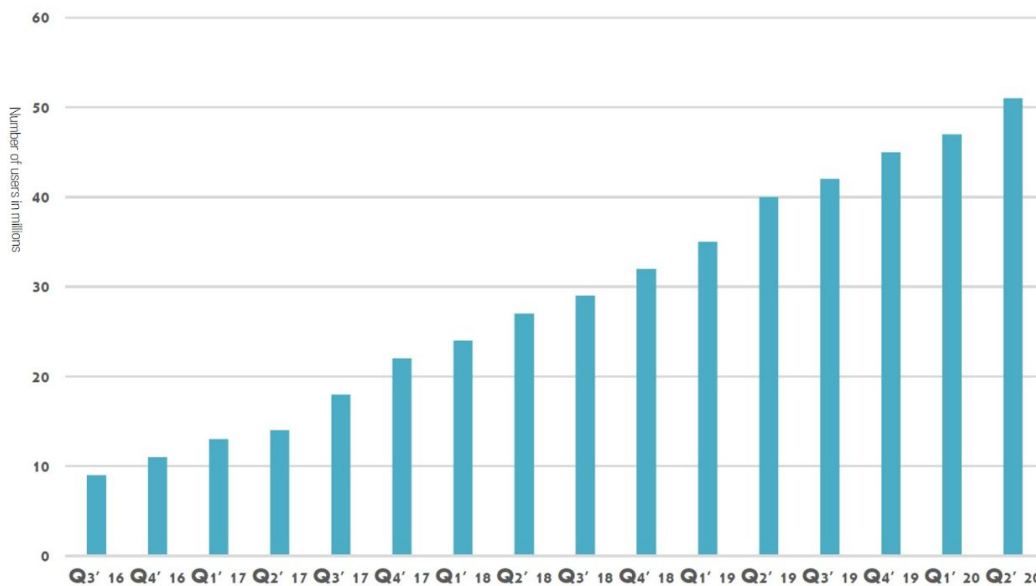


fig 1. Blockchain Wallet User Number Trends.

Professionals expect this new technology to prosper and mature even more with international Beheymes like IBM, Amazon, and Facebook start their ventures in the field. For example, Facebook released the stablecoin 'Libra' that is exchangeable in USD and Euro, and top global cryptocurrency exchange, Binance, launched its stablecoin also. Major media and conferences expect blockchain to make up at least 10% of the world's GDP by 2025.

However, Initial Coin Offering (ICO) –one of the most well-known early-stage funding method for blockchain startups– is highly controversial yet. Following Ethereum's footsteps, many companies used ICO as their primary funding method. Nevertheless, this only spotlighted cryptocurrencies such as Bitcoin or Ether, over the actual functional benefits such as immutability, and decentralization. This overheated market trend only begot a stigma about the technology.

Although ICO is the easiest funding method, it comes with a significant risk for investors since there are no legal safeguards that naturally led to numbers of ICO related frauds. Since the debut of Bitcoin in 2008, there have been countless attempts to perfect the technical

imperfection to solve issues, but there is no known blockchain platform that iron out the dilemmas yet.

1.2. Limitations of cryptocurrency

1.2.1. Limitations of transaction speed

Many technologies realize blockchain's unique advantages: Scalability, Decentralization, and Immutability. However, since 2008, there has been no solution that successfully incorporates all aspects, mainly due to the mutual relationship between speed and decentralization.

Blockchain's fundamental aim is absolute decentralization, which requires an exceptionally complicated consensus algorithm. This complexity inevitably results in slower speed in current blockchain engines. To provide real-life services that require higher speed, companies chose mitigated decentralization that deviates from Bitcoin's completely decentralized consensus algorithm.

Furthermore, blockchain engines with full decentralization must face scalability issues. Per its nature, all of the network's participating nodes must be broadcasted upon the new block creation. Thus, the more participants in a network means the more recipients of the broadcasted information, which results in slower service speed. No one has yet provided a viable solution to this subject.

Given the situation, companies focused on solving the speed issues to commercialize the technology. The market usually uses VISA and Mastercard's transaction per second (tps) rate as a compatibility indicator. To at least compete with existing server-client systems, blockchain must reach VISA's 24,000 tps or Mastercard's 38,000 tps.

As a result, many developers abandoned total decentralization. A blockchain solution without decentralization lacks a unique edge against the traditional server-client system that automatically resulted in the exclusion of the technology. Now, the perfect blockchain technology is almost a myth.

Regardless of the speed, this technology offers many other competitive benefits: decentralization, immutability, and transparency. However, if anyone solely focuses on exceeding the transaction speed of the current system, blockchain technology will inescapably face extinct.

1.2.2. Limitations of storage

The issue of storage space also limits blockchain's commercialization. Current technology could handle the Bitcoin engine's 7tps without a problem. However, all the newer engines with exceptionally higher tps than the previous engines require incomparably larger storage space.

For example, all existing servers cannot handle an engine with 10,000tps for a month. A block with 250 words amount of data becomes 500 bytes. Meaning 5MB amount of data is created in a second, which becomes 12.96TB a month. A fully functioning blockchain must store all of this data in the nodes, thus the storage problems.

All of the companies that claimed 'faster blockchain engine' during their initial coin offering did not address the storage obstacle. At the time, investors did not possess sufficient knowledge of the new technology and overlooked such an apparent potential problem.

Full commercialization of the blockchain technology requires sufficient speed and ample storage with complete decentralization.

2. How to Commercialize Blockchain

GlottoChain is designed to compensate existing engines' flaws and apply blockchain technology in real-life scenarios. GlottoChain maintains full decentralization. Also, the transaction speed may not be entirely on the VISA or Mastercard level; however, it can adequately provide general services. With these exceptional perks, upon the issuance of Glotto Coin (GLTT), the platform will expand to the lottery, online casino, and gaming industry and gradually increase the coin's versatile application.

2.1. How to overcome limitations

GlottoChain operates on the perfect blockchain engine, SASEUL, with adequate tps. SASEUL is ArtiFriends Inc.'s unique and independently developed blockchain engine. ArtiFriends Inc. is widely known as its highly professional staff specializing in artificial intelligence, big data, and blockchain. SASEUL's Hypothesis Acceptance Protocol-2 (HAP-2) resolves any potential scalability issues. The engine proved steady network speed for the past year regardless of the number of network participants with its distinctive Proof of Rule (PoR) consensus algorithm. Also, the concept of Supervisor Node actualized Multi-Chain Structure to alleviate speed concerns. The entirely different initial approach to the idea of verification sets SASEUL apart from other existing blockchain engines. Furthermore, the Arbiter Node helps to lighten the storage issues. Chapter 3 of the white paper explains further technical details.

3.Details of our Technology – SASEUL

This chapter introduces SASEUL's distinctive advantages and characteristics in detail compared to the existing consensus algorithm and its imperfections.

3.1. Consensus

To better understand the new blockchain engine, SASEUL's, consensus algorithm, the basic understanding of existing consensus algorithms is mandated. In this chapter, two major algorithms, Proof of Work and Proof of Stake, and their potential improvements are proposed.

3.1.1. Proof of Work – PoW

The PoW consensus algorithm mainly appears during the mining process. Mining indicates one calculating and solving Hashcash. Among the participants, the one who solves the Hashcash is granted the right to generate a new block and receive a commission. The difficulty of Hashcash problems is automatically adjusted to maintain the block generation pace steadily. The Block hash is encrypted with the SHA-256 encryption method and consists of the previous block hash, transaction hash, timestamp, and nonce.

There are about 20 cryptocurrency based on PoW consensus algorithms in the current market: Bitcoin, Ethereum, and Quantum are the most known examples. Ethereum is categorized as PoW since its basis is the ERC20 standard.

The main drawback of PoW is the massive amount of computing power to solve Hashcash. Cryptocurrency fever caused a sharp increase in the number of bitcoin mining participants, and there is only a finite amount of bitcoins to mine. Therefore, in this red ocean, whoever owns higher computing power gains the upper hand in the network, which results in defying the original intention of forming a P2P electronic cash system that is entirely decentralized. Besides, the finite amount of bitcoin to mine results in a vast price fluctuation eventually.

3.1.2. Proof of Stake – PoS

PoS appears when the Validator Node is verifying transactions before they are stored in a block. Only a few nodes with a sufficient amount of stakes are entitled as validators to prevent disarray, where all the participating nodes try to verify the validity of transactions. Later, the validators authenticate the validity of transactions and receive commissions as a reward. PoS, unlike PoW, does not require an extensive amount of computing power to compete with other nodes. Hence, a small number of nodes with better computing capability cannot maintain the upper-hand in the network.

Regardless, this does not free PoS from imperfection. Bottleneck happens when a relatively smaller number of validators try to process a large number of transactions. If the number of validators increases to prevent bottleneck, a delay in the consensus process occurs among the validators, which results in a decline in tps. Therefore, it is hard to expect PoS to bring better scalability to the blockchain network.

3.1.3. Proof of Rule – PoR

Hypothesis Acceptance Protocol (HAP) is the SASEUL engine's primary means of unifying data on a network, and the most stable version of HAP, HAP-2, is currently being used. The crux of this algorithm is that it recognizes future block data as a hypothesis, and a block decision is made by merging all the hypotheses into one. If there is an existing block, it is also seen as a hypothesis, and each node makes a self-centered decision about the hypothesis' acceptance. Based on these decisions, decision-making logics are accumulated into a set of rules, and the validation process based on these rules is called Proof of Rules (PoR). With PoR, a higher number of validators does not result in slower tps and bottleneck compared to PoS. Also, few nodes with better computing power do not possess relative dominance over others like PoW.

3.2. Introducing GlottoChain Engine – SASEUL

3.2.1. Description

Blockchain is a decentralized data transfer/storage technology that saves network data in the form of an abiding block. It periodically creates data embedded blocks and connects them like a chain. When there is a data transaction, a centralized server does not store the transaction; instead, all participating nodes share, store, and chain the data in the form of a block: a distributed ledger. This ledger prevents data forgery since all participants share the same data, which gives the new technology a significant edge on reliability and safety.

Professionals recognize blockchain as one of the core technologies for the fourth industrial revolution, primarily due to its security and transparency that could be applied in a broad spectrum of businesses. However, it is hard to find an existing business that can successfully incorporate this new technology.

Therefore, to actualize its full functionality in the real market, blockchain must fulfill all three aspects, as shown below.

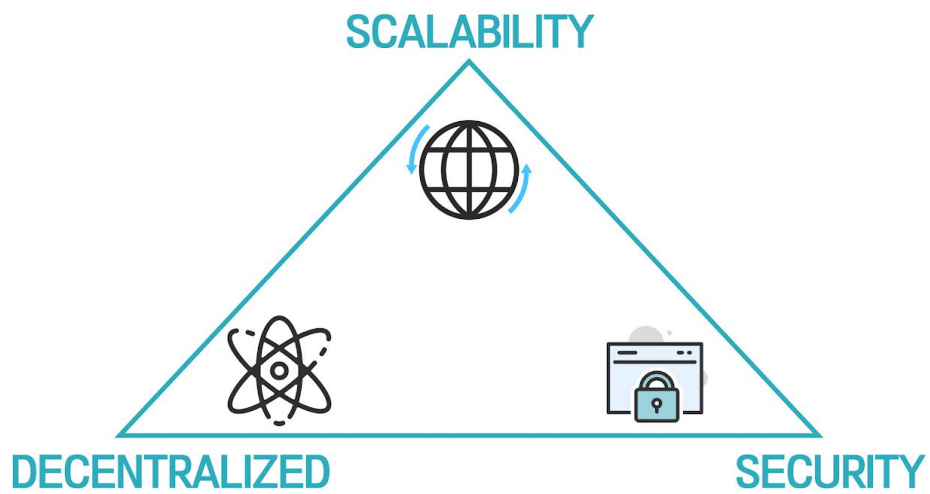


fig 2. Blockchain Trilemma.

There is no standing blockchain engine that successfully satisfies all three features; thus, the blockchain trilemma. SASEUL is the only blockchain engine yet to fulfill the complete decentralization with both security and functionality.

3.2.2. Definition of SASEUL Nodes

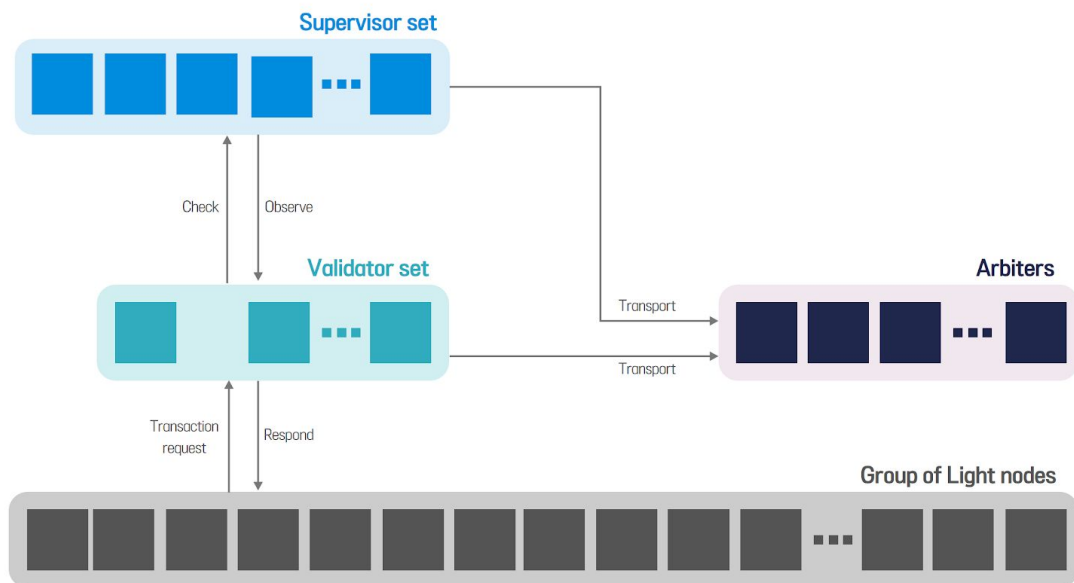


fig 3. SASEUL Origin Network Scheme.

(1) Light Node

Light node is the most basic node in a network and widely used in wallets and other services for the end-users. The node includes a unique private key and tracker and can produce/request transactions, and its results.



fig 4. Light node creates and transmits transaction requests.

(2) Validator

Validator is the approved node to participate in the consensus process after its synchronization with the blockchain. It produces approved data in the form of a block after the consensus process of received transactions from the network. The consensus process follows GlottoChain's consensus algorithm by communicating directly with the light nodes. Produced blocks are periodically hashed and transferred to the arbiter.

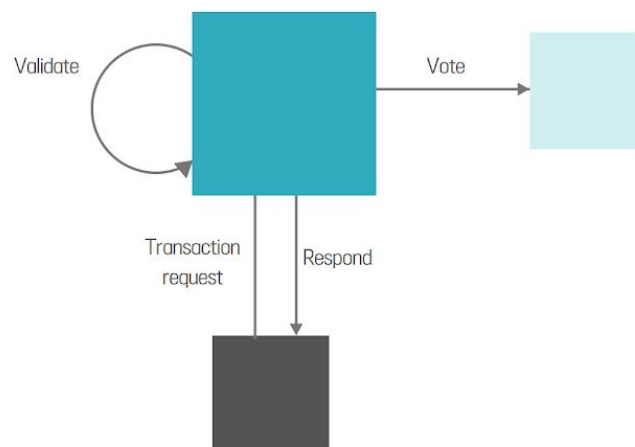


fig 5. Validator participates in transaction processing and performs transaction request approval, vote, and response functions.

(3) Supervisor

The supervisor node administers the network to see if it produces valid blocks and saves them. It is possible to detect problems in the system such as foul hash generation, but it is impossible to intervene directly by any means, including creating a new transaction.

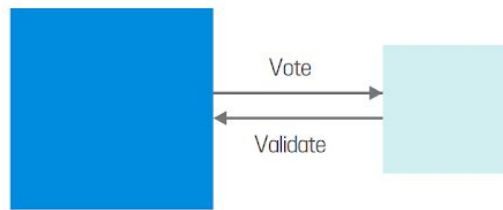


fig 6. The supervisor can inquire about all the consensus in the network. Validators can use this as a ground for their decisions.

(4) Arbiter

The arbiter node saves all the blockchains. It does not participate in the decision process; however, it provides comparison data from the past for validators and mostly alleviates storage issues within the blockchain ledger.

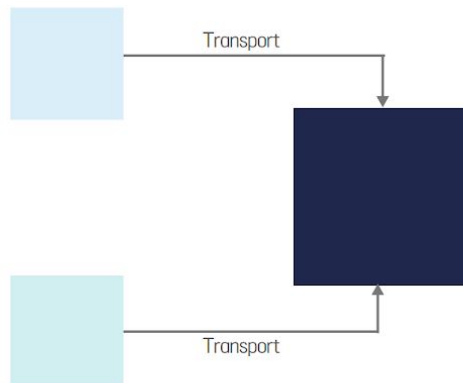


fig 7. Arbiter receives and stores data after every chain lifecycle.

4. Ecosystem Expansion Plan

GlottoChain is planning both platform integration and global dApp development as a part of its ecosystem expansion. Initially, issued GlottoCoin (GLTT) will only be accepted as a restricted platform coin. Though, smart contract formulations with the virtual machine are supported to expand the network. Most of the companies that have already committed to ICO or preparing one cannot fully actualize their whitepaper, mainly due to the current blockchain's technical limitations. Naturally, these companies are waiting for the new blockchain engine that could bring their projects to life, and GlottoChain is expected to provide a secure solution. Glottochain will prove its technical superiority and security with its Killer dApp and accomplish ecosystem expansion by integrating many ICO projects.

4.1. Platform Migration

Many ICO projects publish their coins based on Ethereum. Despite its advantages in building a smart contract system and secure network, projects must face slower tps that bars dApp development. It is not just a matter of Ethereum. Most of the companies cannot make a confident decision between tps and decentralization.

Although some of the existing engines show promising performance, most of the others still struggle with higher tps services. Therefore, GlottoChain will provide them an ecosystem where they can successfully actualize the platforms in the Glotto Coin ecosystem.

Moreover, with user-friendly program tools and faster tps, an efficient token exchange is encouraged—"Easy to Move" platform of integrated mixed tokens. By assisting realizing other ICO projects, GlottoChain's ecosystem will also expand.

4.2. Development of dApps

A stable engine is vital in blockchain ecosystem augmentation. The perfected engine, SASEUL, is expected to attract more nodes with active dApp development.

4.2.1. Lotto Purchasing Agent:

Blockchain based Lottery Purchasing dApp

In 2020 South Korea, lottery sales take up 0.3% of nominal GDP with a 4.8 billion USD amount. This percentage is smaller compare to other OECD countries' 0.43%. The average lottery sales volume of these nations is expected to reach multi-billion USD considering their economic scale. Technavio report claims by the year 2024, the global lottery market will reach 220 billion USD. The prize amount differs dramatically between countries and brands; however, the price of purchasing lottery tickets is almost identical.

Governments strictly manage the lottery business, and regulations differ nationally and regionally, resulting in decreased international accessibility for potential consumers. Therefore, an easy-to-access lottery with a larger prize pool will inevitably attract more customers. In the United States, for example, tourists are permitted to purchase lottery during their stay; however, they must buy directly, and if they win, they must collect the prize in person. It is possible to have a legal representative receive the prize, but the process is highly complicated.

There are a few international lottery purchasing agent platforms, but they come with a couple of significant concerns. The biggest problem is that it is nearly impossible to verify

the purchase. It is simple to forge the lottery purchase identification number online. Most of the clients who use such platforms are unable to visit the actual countries where they purchased the lottery from through the agents, making it harder for them to verify the purchase physically. Simple misleading web contents presentations can easily deceive consumers. Moreover, due to its extremely low possibility of winning a lottery, the agents' risk of not even purchasing a lottery is low. Therefore, if blockchain were to effectuate such service, its immutability will provide the consumers with peace of mind.

Even with legitimate international lottery purchases and the great fortune of winning one, there still is a challenge. During the collection process, the buying agents have no clear clues on how each country's regulation will strive to prevent the outbound international money flow since the agents have never experienced it enough.

To avert such undesirable disaster, GlottoChain pays its prize money in Glotto Coin. Upon its legal registration on the international cryptocurrency exchange markets, it can be easily traded with bitcoin and Ethereum, not to mention its uncomplicated encashment ability.

"Lottery Purchasing Agent" is a humble beginning of dApp development. This gradual achievement will vitalize the GlottoChain ecosystem and become an excellent bridgehead to the next step – the online casino.

4.2.2. GlottoChain: Blockchain Global Lottery – Glotto

The blockchain-based global lottery is a prominent solution to the diverse and complicated lottery related regulations, fairness, and accessibility issues in international lottery purchases. Since all participants can browse complete lottery ticket information in the pool, there is little risk of fairness. A solution like this existed before once; however, after the initial fundraising and coin price escalation, the actual service never lasted. GlottoChain can effectively attract international buyers with its unique security features. This accomplishment, combined with the profit from the global lottery itself, will allow the platform to prosper and provide better security to the coin owners. With better funding, the GlottoChain Foundation's R & D department can reinforce and further secure the transparent and trustworthy lottery service.

Many lottery buyers show risk-preference propensity, which makes them valuable potential clients for Sports Toto and online casino services. Also, this very clientele is predisposed to cryptocurrency experiences. Specific currency's value fluctuation does not affect cryptocurrencies directly. This characteristic makes them one of the strongest candidates for a superstate platform. Potential customers from countries with difficulty in possessing foreign exchange, like China, can efficiently utilize it too. Projects that raise their funds with only the concepts and ideas tend to show absence in a market-oriented attitude. In

contrast, GlottoChain will focus its highly specialized resources on gradually improving the current market itself with customers' satisfaction level and competitiveness.

a. 4/20 Lotto

One can win 4/20 Lotto by correctly guessing four numbers between 1 and 20. The draw is once in two hours, and prize distribution is like below.

- 1st Prize (4 correct numbers): 33%
- 2nd Prize (3 correct numbers): 33%
- 3rd Prize (2 correct numbers): 34%
- Ticket Price: 0.005 ETH (~1.4 USD)
- Minimum Guaranteed Prize Pool: 50 ETH

b. 6/45 Lotto

One can win 6/45 Lotto by correctly guessing six numbers between 1 and 45. The draw is once in 12 hours, and prize distribution is like below.

- 1st Prize (6 correct numbers): 25%
- 2nd Prize (5 correct numbers): 25%
- 3rd Prize (4 correct numbers): 25%
- 4th Prize (3 correct numbers): 25%
- Ticket Price: 0.01 ETH (~2.8 USD)
- Minimum Guaranteed Prize Pool: 1000 ETH (~280,000 USD)

5. GlottoChain Project Plan

5.1. GlottoChain Token Economy

Blockchain suits the best for the industries with strict regulations and secure prospective customers. In 2020 the lottery industry exceeds 300 billion USD in market size and shows a market share of 29% of the global gambling industry. Each country's stringent regulations strand international investors' vast interest in this particular market. These investors are the heart of GlottoChain's token economy.

70% of the sales are used as prize money, and half of the rest, 15%, is allotted to the token holders. Unlike the traditional lottery system, the sales and distribution of proceeds occur much faster. Notably, the distribution finalizes within 10 seconds upon the closure of every draw. Because this distribution process could take up to a year in the traditional lottery

system, it has ample competitive advantages. Also, depending on the profitability of the project, the token itself could increase in value.

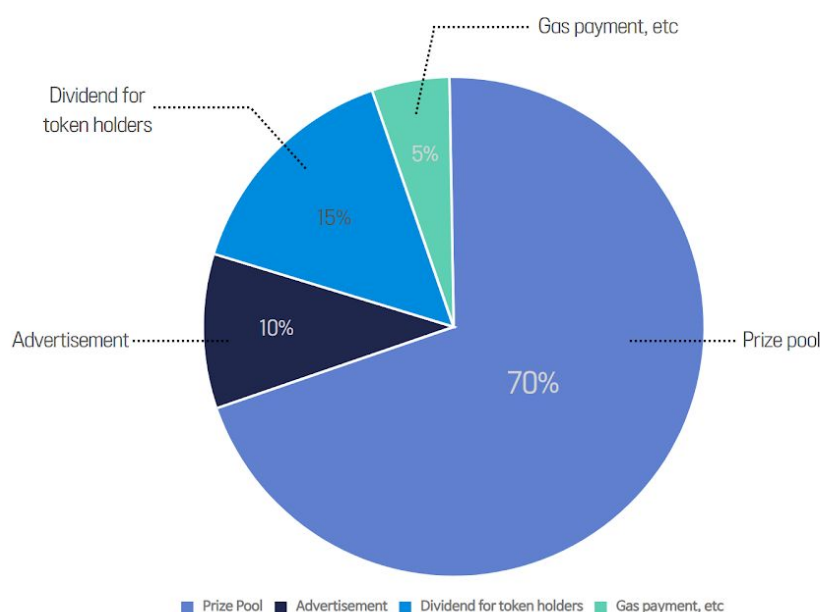


fig 8. Distribution of the Lottery Sales Profit.

As shown above, 10% of the sales profit is allocated for advertisement and 5% in technical cost. The gas payment is part of the technical cost since Ether is acknowledged as Glotto purchasing currency after the ERC-20 fundraising.

5.2. Glotto Token & Glotto Coin (GLTT)

5.2.1. Phase 1: Glotto Token

Glotto Token is initially distributed through ERC-20. Of the 10 billion issued tokens, 3 billion tokens will be on sale. During the Initial Public Offering (IPO) or early-stage IPO, the tokens are distributed on the exchange platforms. Through this, positive impacts such as motivation for other exchanges to participate, rise in the market price, and greater exposure to the potential customers that own cryptocurrencies are expected. Initial token sales should be limited to the fewer number of exchanges. However, the Lottery Purchasing Agent service with the Ethereum deposit structure should stay as the main focus of the operation.

5.2.2. Phase 2: Glotto Coin (GLTT)

After the launch of the GlottoChain mainnet, Glotto Tokens are converted to Glotto Coins. Without a particular cause for an adjustment, the conversion ratio will be 1:1, and the coin

can be used in transactions on the mainnet. Thus the actual global blockchain lottery platform is completed on the GlottoChain mainnet.

Particularly, 4/20 Lotto is expected to increase the service's money supply with frequent ticket purchases and prize collections, and this can relate to the better opportunity of expansion to other services on the GlottoChain such as online casino and Sports Toto.

Throughout this phase, Glotto Coin will actively seek more opportunities in better profitability by listing on other major exchanges, which will lead to a higher return on investment.

5.3. Token Distribution

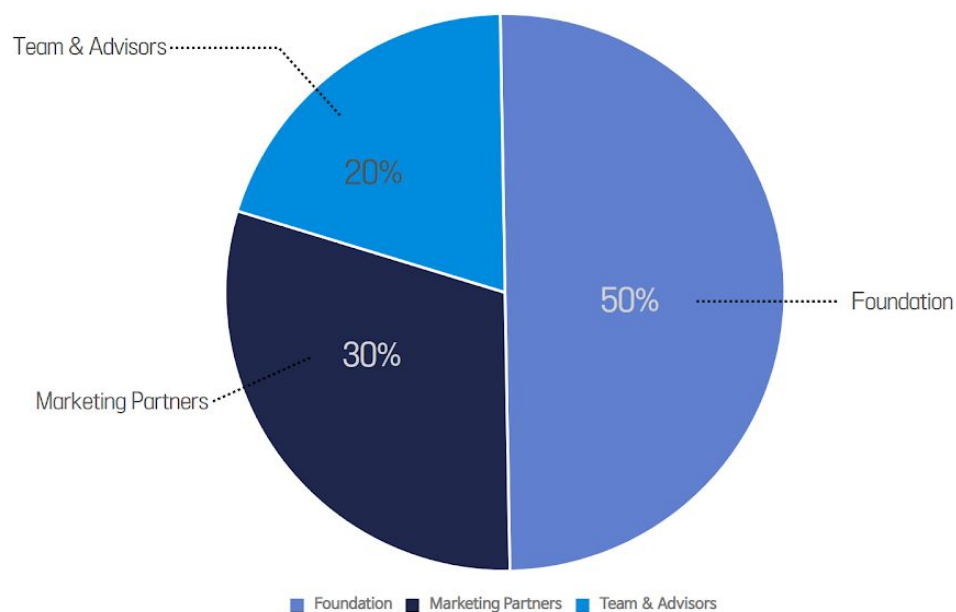


fig 9. Token Distribution.

- Total Tokens Issued: 10 Billion
- Team & Advisors : 20%
- Foundation : 50%
- Marketing Partners : 30%

5.3.1. Lock-Up schedule

- Foundation Reserve Tokens: 5 Billions
- Foundation Reserve Tokens may be distributed within the Glotto Ecosystem or to business partners for marketing purposes in the future, and in that case, lockup is set for at least 6 months from the date of distribution.
- Tokens distributed to Team & Advisors are locked up for at least 3 months from the date of distribution.

5.4. Main Project Milestones and Development Roadmap

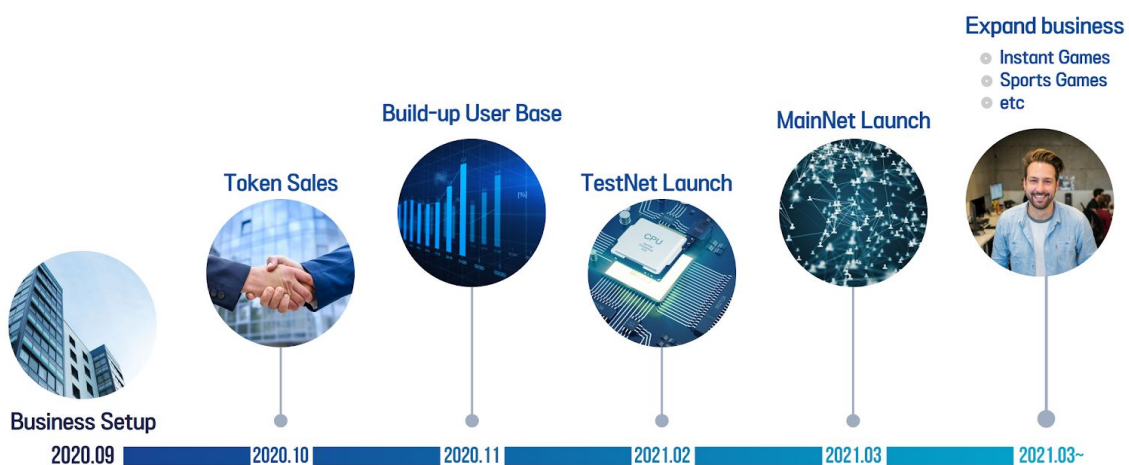


fig 10. GlottoChain Roadmap

Business Setup (~2020. 09)

- Securing target countries for the lottery purchasing agency service:
United States, Germany, England, Australia and more
- Initial team formation (Minimum development and operation team)
- Team organization and human resource planning

Token Sales (~2020. 10)

- Commencing token sales on exchanges with IPO favorable conditions
- ETH fundraising through ERC-20

Buildup User Base (2020. 10~2020. 11)

- Initiating international lottery purchasing service

- Focusing marketing activities on for current and potential customers

GlottoChain MainNet Launch (2021.03~)

- GlottoChain Test Net launch (2021. 01 ~ 2021.02)
- Mainnet launch (2021.04)
- GlottoChain Whitepaper V2.0

Expand GlottoChain-based Businesses (2021.03~)

- Blockchain Glotto Service commence
- 4/20 Lotto draws every 2 hours, and 6/45 Lotto draws every 12 hours (*adjustable)
- Glotto Coin is used for the ticket purchases and prize money payouts (*ETH can also be used)

Disclaimer

Nothing in this White Paper is an offer to sell, or the solicitation of an offer to buy, any tokens. GlottoChain is publishing this White Paper solely to receive feedback and comments from the public. If and when GlottoChain offers for sale any tokens (or a Simple Agreement for Future Tokens), it will do so through definitive offering documents, including a disclosure document and risk factors. Those definitive documents also are expected to include an updated version of this White Paper, which may differ significantly from the current version. If and when GlottoChain makes such an offering in the United States, the offering likely will be available solely to accredited investors.

Nothing in this White Paper should be treated or read as a guarantee or promise of how GlottoChain's business or the tokens will develop or of the utility or value of the tokens. This White Paper outlines current plans, which could change at its discretion, and the success of which will depend on many factors outside Solanas control, including market-based factors and factors within the data and cryptocurrency industries, among others. Any statements about future events are based solely on GlottoChain's analysis of the issues described in this White Paper. That analysis may prove to be incorrect.

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Appendix I. Projected DPS in 2021, 2022, and 2023

According to the lottery and game types analysis, the Draw-based games compose 60%. Recent national statistics also show consistent 55~65% of composure.

Because the lottery market is already a red ocean mega-market with low growth potential, assume that the Draw-based games market is accountable for 180 billion USD, with a growth rate of 0% out of the entire 300 billion USD lottery market.

If the Draw-based games' annual market shares are 2%, 6%, and 12% from 2021 to 2023, the sales volume calculates 540 million, 1.62 billion, and 3.24 billion USD.

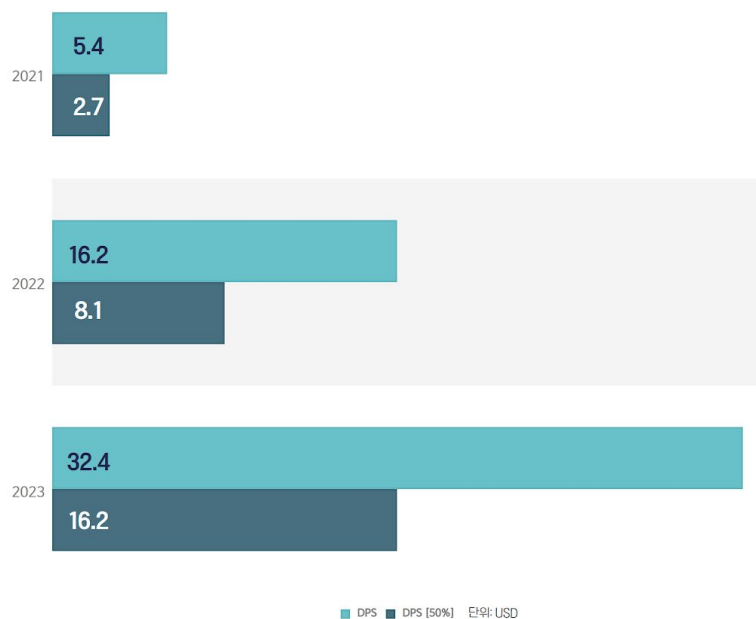


fig 11. Projected Dividend per share(DPS) 2021~2023.

Accordingly, annual allotment per token is 5.4 USD in 2021, 16.2 USD in 2022, and 32.4 USD in 2023, and if half of the original goal is achieved, the amount also cuts into half.