

# inSure Ecosystem

Decentralized Insurance Platform  
inSureDAO  
(<https://insuretoken.net>)

## Abstract

inSure is a community based crypto portfolios/DeFi insurance system. The project aims to create an ecosystem to distribute the risks, where premiums are determined by a Dynamic Pricing Model. Capital required to back the risks at any point of time will be based on the market pricing of SURE tokens and community demand for insurances of the crypto portfolios. Decentralized support system will be established to diligently process all the insurance claims and implement the layers of inSureDAO voters to make sure any fraudulent claims are flagged and only valid claims are fulfilled.

## Background

Insurance is a tool that helps to re-distribute risk across the community. Due to the extensive amount of capital required to underwrite these risks, the multi-trillion-dollar industry is dominated by huge companies that have the ability to pool capital at scale for potential claim obligations. [1]

The profitability of insurers depends on the amount of claim payouts relative to the amount of premiums collected. Despite heavy regulatory oversight, there exists an agency problem as there is an incentive for insurers to turn down claims. In addition, the conservative nature of insurers and their increasing reliance on data-driven risk assessments means that the protection gaps of newer risks will continue to remain unfilled.

An example of an underserved segment is the Decentralized Finance (DeFi) sector and crypto. The rapid development of DeFi and innovative liquidity mining schemes have brought about a substantial increase in the total value of assets utilized on the

blockchain. Liquidity providers are willing to provide capital to bootstrap DeFi products in return for yields without fully understanding the potential security risks. Even with security audits in place, the nascent DeFi sector continues to be a target of hacks, smart contract exploitations, resulting in the loss of users' funds.

inSure is purposefully designed to solve the agency problem and allow anyone to become an insurance issuer for the DeFi sector and crypto portfolio holders. inSure Ecosystem is created to protect traders and investors from scams and drastic devaluations that threaten crypto portfolios.

**What we Do:** Offering the Best Insurance for Crypto Portfolios.

We are tired of seeing people get scammed and having no collateral for their DeFi losses. Our solution will protect your portfolio from scammers and unexpected losses. We provide different plans that are very clear and simple to understand.

**Mission:** Protect Crypto Investors from Scammers & Devaluations. The first idea behind this project is to get rid of the situations where our fellow investors lose their money completely.

We are here to provide stability to the crypto world and protect people from their mistakes and from fraudulent activities of others.

**Goal:** Help as Many Investors & Traders as Possible. We don't want our fellow investors & traders to end-up in a situation where they lose most of the crypto portfolio because of unexpected causes.

Helping other people is very important to us. We are willing to establish a 24/7 support system to help as many people as possible.

interested in bringing Google Cloud Platform's ML services (e.g. AutoML [6] and Inference APIs[7]).

## Economic Model - How it works

inSure's Crypto insurance is based on 1) Dynamic Pricing Model[2], to find the right market price via supply and demand; 2) the Capital Model[3], to secure capital required to back the risks at any points of time; and 3) inSureDAO voting mechanism, to make sure every claim is handled in a permissionless and transparent manner.

## Google Cloud-blockchain Applications & inSure Ecosystem

Blockchains focus on mathematical effort to create a shared consensus. Ideas quickly sprang up to extend this model to allow party-to-party agreements, i.e. contracts. This concept of *smart contracts* was first described in a 1997 article by computer scientist Nick Szabo [4]. An early example of inscribing agreements into blocks was popularized by efforts such as Colored Coins [5] on the Bitcoin blockchain.

Smart contracts are embedded into the source of truth of the blockchain, and are therefore effectively immutable after they're a few blocks deep. This provides a mechanism to allow participants to commit crypto-economic resources to an agreement with a counterparty, and to trust that contract terms will be enforced automatically and without requiring third party execution or arbitration, if desired.

But none of this addresses a fundamental issue: where to get the variables with which the contract is evaluated. If the data are not derived from recently added on-chain data, a trusted source of external data is required. Such a source is called an oracle.

inSure Ecosystem is planning to use Chainlink and Google Integration to receive the data that is updated and available through the trusted off-chain bridge.

We are working on creating a hybrid application that takes the best of what smart contract platforms and cloud platforms have to offer. We're particularly

## Capital Pool

The Capital Pool is an important business module of the platform to support the business development. inSure tokens will be rewarded to capital providers of the pool [8].

The tokens received from staking on DEXs could be used to

- 1) stake on the projects and earn premium;
- 2) hold to enjoy the benefit from the growth of the ecosystem and leverage provided;
- 3) sell in the market to realize profit.

With the support of the capital pool, business will generate attractive profit to inSure token holders, which will result in the increase of the token price. Higher token price will further attract more capital to conduct business.

When the surplus pool is unable to cover the Minimum Capital Requirement (MCR) [9], the withdrawal transaction of the capital pool will be frozen until the drop of MCR, which may result from the expiration of insurance plans or the coming of new funds.

When the surplus pool cannot cover all the claims, the capital pool will be used to pay the rest. The Capital Model is used to monitor systematic risk, and give the capital pool attractive risk adjusted return.

## Purchase Insurance

An insurance stipulates the insurance risk, the insurance amount, the date of insurance and the corresponding premiums. Users can use ETH, USDT, BTC, wETH to get the desired insurance plan

for their crypto portfolio. The insurance will automatically take effect after 7 days of SURE tokens being placed to the private wallet of the policyholder.

The policyholders will also share a small portion of the capital surplus. We believe this mechanism will help the community to attract enough capital supply and demand to further expand the ecosystem.

## Surplus Pool

The surplus pool will accrue whenever an insurance premium is paid. 40% of the premium will be added into the surplus pool. Another 10% will be reserved till the expiration of the contract. If there is no claim, it will add into the surplus pool. The surplus pool will grow over time and will be utilized to cover insurance claims first. [10] When the surplus pool cannot cover all the claims, the capital pool will be used to pay the rest. When the surplus pool grows large enough, the SURE holders will receive % from the staked SURE to better incentivise increase of the inSure Staked Pool.

inSure holders can stake on different DEXs and earn % from each trade in addition to the insurance that inSure plans provide.

For the first phase, we will focus on the risk against scams, devaluations and stolen funds. More less-correlated business will be introduced to deliver higher returns to token holders at community's vote.

## Risk Model Consideration

Risks are diverse. It is technically impossible for us to measure all risks and accurately calculate the required risk capital. Therefore, the risk reserve mentioned here refers to the minimum capital requirement that will not lead to "bankruptcy". We determine the minimum capital requirements based on the capital model. The source of the risk reserve consists of two parts, one part comes from the withdrawal of a certain percentage of the amount from each insurance policy,

and the other part comes from the special compensation amount locked in the claim pool.

First of all, we must identify and select the main risks to be considered, which are mainly divided into four categories: asset risk, pricing risk, interest rate risk and other business risks; Secondly, use the probability of bankruptcy to calculate the risk coefficient and determine the risk capital required for this type of risk; Finally, we make adjustments based on the correlation between the risks. [11]

Assuming that the total amount of the claim pool is  $A$  and the asset value of the insured amount is  $L$ , it should be ensured that for any small  $\epsilon$ ,  $P\{L > A\} \leq \epsilon$ . [12] The platform's surplus level is  $(A-L)$ , 40% of which is withdrawn to the remaining and 60% of the risk reserve is used for dividends and management.

We set the random variable  $X = -(A-L)$ , and the venture capital MCR is the minimum capital required to resist the adverse fluctuation of  $i$ . If  $\epsilon = 0.05$ , the probability that  $X$  is not higher than the minimum capital level MCR must remain above 95%, that is  $P\{X \leq MCR\} \geq 95\%$ . The minimum capital level MCR is obviously related to the confidence level  $1 - \epsilon$ . If we know the distribution function of  $X$ ,  $F(x)$ , and we are going to require MCR, we only need to set  $F(MCR) = \epsilon$ , which is the quantile point corresponding to  $\epsilon$ . Its geometric meaning is shown in the figure below, where  $E(X)$  represents the expected level of the fluctuation of unfavorable earnings and MCR represents the minimum capital requirement.

If we consider only one type of risk, the principle is the same. Unfavorable volatility is  $X = E(A) - A$  or  $X = L - E(L)$ . Venture capital MCR can be understood as the minimum capital requirement to absorb unfavorable fluctuation, namely  $P\{E(A) - A > MCR\} \leq \epsilon$  or  $P\{L - E(L) > MCR\} \leq \epsilon$ . If the probability distribution of  $A$  or  $L$  is known, then MCR is the

corresponding number of points, expressed as:  $MCR = E(A) - \gamma(\varepsilon)$  or  $MCR = \gamma(1 - \varepsilon) - E(L)$ .

Suppose we make  $A$  or  $L$  obey a normal distribution, then  $MCR = \Phi(\varepsilon) \times \sigma$  or  $MCR = \Phi(1 - \varepsilon) \times \sigma$ ,  $MCR$  then the risk factor of the asset is  $E(A)$  or  $E(L)$ , which is the ratio of the minimum capital requirement to the premium. From this, we can calculate the minimum capitals required for future claims based on the amount of premium and hence adjust the covariance

In addition, if the expected cost of bankruptcy is increased, we are required to control the expected cost of bankruptcy to a percentage lower than the expected gap, such as 1% or 0.1%. When considering the liability risk, it can be assumed that the asset value is fixed. The asset value  $L$  of the insured amount is a random variable, and it obeys a continuous probability distribution whose distribution density is  $p(x)$ .  $EPD$  refers to the overall average of the portion of liabilities exceeding assets, the so-called gap or bankruptcy cost [13], that is:

$$D_L = \int (X - A)P(X)dx_A$$

Suppose we have  $n$  types of businesses of the same scale, the concentration is  $f = 1/n$  the premium income of the largest type of business / the premium income of all businesses, and the risk capital  $MCR$  of each type of business is the same.

**Assumption 1:** we overestimate  $MCR$ , and **Assumption 2:** we underestimate  $MCR$ . Thus just offset their adverse effects. The concentration adjustment factor is

$$\sqrt{\rho} + (1 - \rho)f \approx \sqrt{\rho} + \sqrt{1 - \rho} \times f$$

Given  $f$  is relatively small. If it is assumed that the average correlation coefficient between each business is 0.4, then  $\rho = 0.4$ ,  $\sqrt{\rho} = 0.63$ . Then the adjusted

reserve risk capital requirement  $MCR = 63\% + 37\%$  (the largest business reserve/all business reserves).

### Pricing principle

The pricing of insurance products is to use the data of past accidents to obtain the probability of risk. This risk and its probability of occurrence are objective and measurable. This is also the fundamental basis for determining the insurance premium. [14]

The law of large numbers is that when enough events of the same nature occur, their risk probability will be closer and closer to the actual probability, so that a more accurate estimate can be obtained. Since there are differences in the way of thinking of each individual in real life, it cannot be assumed to be independent and identically distributed, so it is more. [15]

In more detail, if we take into account the correlation of risks between different businesses, we have to quote the Chebyshev Theorem of Large Numbers. [16]

Suppose that  $x_1, x_2, \dots, x_n$  are a group of independent random individuals, each of which has an expected value  $E(x_k)$  and a variance  $D(x_k)$ . If there is a constant  $MCR$  which makes  $D(x_k) \leq c(k=1,2,\dots,n)$ , then for arbitrarily small positive the final cover price for the claim settlement and internal cost.

The model has the following pattern:

When capital supply is high, i.e. more power is backed for a risk, the premium rate will be low.

When demand is high, i.e. more policies (insurance plans) are sold out, the premium rate will increase.

More token is backed for a risk, i.e. more popular, less volatile of premium rate change is, and vice versa for a less popular risk, the premium rate will be sensitive for large demand change to avoid pricing error.

## Capital Model

Insurance is a highly leveraged industry; therefore, the primary concern of the insurance capital model is to calculate the capital required to guarantee solvency of the risk pool to some arbitrary and high confidence level like 99.9% in the latest EIOPA's Solvency II framework. [17]

The Capital Model is used to calculate the minimum capital the fund needs to hold, which is used to determine 1) the capital locked in the Capital Pool and 2) the staking power used in the Staking stage.

## Pricing Model

However, due to the current lack of historical data on smart contract exploits, scams, devaluations, loss of funds and lack of relevant information on assisting pricing, it is expected that the cost of the new policy at the beginning will be higher. As the insurance policies undergo more related tests, the processing cost will gradually decrease.

Rather than a single centralized entity setting up a premium rate, or individual capital suppliers and policy holders having to negotiate over premium terms, inSure uses the Dynamic Pricing Model to set the price, based on supply and demand, the tokens backed and the policies bought. We assume the risk backers' thinking to follow a beta distribution.

be used for paying the premium and the liability will also be based off these currencies accordingly. Therefore, we will exchange the exposure with all other currencies into a stable currency.

## Submitting Request

If your portfolio was affected by scam, drastic devaluation or stolen funds (exchange closure) inSure Ecosystem will be reimbursing losses based on the plan chosen by you with SURE tokens.

If the policy holder was unlucky and was affected by one of three reasons mentioned above, the email request need to be sent to [request@insuretoken.net](mailto:request@insuretoken.net) including:

1. [Name of the crypto coin/token]
2. [Your Affected wallet address]
3. [Date of the event]
4. [Policyholder's wallet address that holds SURE tokens]
5. [Additional information to take into account]
6. [Sign the following message with your myEtherWallet (that holds SURE tokens): "I am the holder of SURE tokens requesting inSure team to process my request: {include\_all\_points\_from\_1\_to\_5}"]

Please give us 3-4 business days to process your request (we will investigate the issue and provide the best solution within 24-72 hours).

## Claim Assessment

Claim is one of the most important parts of an insurance company. To ensure it is handled professionally, inSure utilizes a 3-phase voting mechanics for claim assessment.

A claim can be submitted by any policyholder. 100% Premium equivalent inSure tokens need to be staked to file the claim. The claim request will to be signed with the Ethereum Wallet of the policy holder.

There will be a 7 days waiting period for new purchases, which means a policyholder has to wait 7 days before his coverage comes into effect, any claims

occurred during these 7 days will not be paid. No waiting period for renewal business.

The initial parameters will be set at research based on the current data we have and will also be monitored and updated based on backers' behavior and community vote.

The capital model result will be calculated off-chain daily, due to gas consideration, to track the systematic risk.

inSure proposes the second phase of voting to be done by the top 5 auditing companies that are chosen by inSure token holders. Auditing companies will stake their inSure holdings to vote and release auditing reports if needed. 5% of the reserved policy premium will be utilized to incentivise the auditing companies. When the decision is made with at least 3/5 consensus over a claim assessment. If consensus is not reached or there are not enough auditing companies' votes then the case will pass to the next phase.

During the pending phase, policyholders can stake inSure tokens and start a challenge. If there is no challenge by any inSure holders, then the claim will be approved and paid. If there is a challenge, then the claim assessment will escalate to the third phase - a public vote.

The first phase of this 3-phase voting can be substituted with a lighter round of voters by decision from inSureDAO.

### **Fulfillment of Insurance Claims**

inSureDAO will process the request with diligence and initiate a transfer of SURE tokens in the amount of insured value based on the plan chosen by the policyholder.

inSure holders are not forced to sell SURE tokens, instead, the customer can sell later to other investors who need insurance for their Crypto Portfolio or keep part of SURE for staking and enabling another insurance renewal plan.

### **Distribution of inSure tokens**

The first issuance is aimed at a small group of cryptocurrency enthusiasts, who also serve as beta product testers to provide feedback on complex insurance products prior to its release. The short to mid-term development goal is to build a safe product/plans that serve the DeFi sector's and crypto investors insurance needs. Majority of the short-term inSure tokens will be distributed via risk pool increase and through participation of the inSureDAO. Broader sales, distribution and marketing channels will be established once the product has a consistent base of users. Given that future iteration of the insurance products require users to purchase inSure tokens to Stake or to be utilized as currency for settlement, a set of sales and payment procedures, as well as wallet tools will be developed to achieve large scale growth.

Our long-term development goal is not only to make products with great use cases, but to build a non-discriminatory platform that allows the masses to participate freely.

Distribution partners can use the integrated open API architecture of the Ethereum blockchain to interact with our SURE smart contract. Users who hold inSure tokens are potentially our sales partners, because every insurance coverage sold generates dividends for all holders of inSure. We will make the smart contract platform design as open and flexible as possible so that distribution partners can interact and communicate under the prescribed conditions.

### **Competitive Advantage of inSure**

A key factor in making a good insurance platform is the health of financial information, such as the usage of funds and whether there are sufficient premium floats to pay potential claims. Since the blockchain is a distributed ledger, each node has the same copy of

the data. When the data changes, every insured person can see the synchronized and updated data, making the operation of each fund open and transparent. Therefore, there will be a dedicated module on the homepage of the website to disclose relevant information, and provide an accurate real-time financial status every quarter such as risk factors, minimum capital requirements, historical data on token prices, a summary of claims assessment, and the number of locked and traded tokens.

## **Roadmap Update**

We will continue to pay attention to product improvements based on market feedback, and launch new products with blockchain code as the core to meet the needs of more users. We hope that with time, community members will drive each other to jointly promote and develop open-source tools for inSure. We are also planning to invest a surplus pool into the hedge funds and long term financial products. As a result of investments activities share the profits proportional to the size of the SURE stake.

## **Capital Pool Size Increase**

The capital pool size will scale alongside the type of product offerings, which will increase the level of diversification benefits for users of inSure. This ensures the effective use of funds, reduces risk costs, reduces the risks caused by insufficient claims, and makes the cost of copying the project much higher. A meaningful network of risk assessors (reputable smart contract code auditors) will be established, and sufficient incentives will be provided for the users to participate.

## **Governed by Community**

Under normal circumstances, all operations on inSure can be completed by smart contracts. But in reality, in order to take into account, the interests of users,

better achieve decentralization effects, and ensure the process to be more transparent, decisions of certain events will require the community to vote. Therefore, the platform will set up an inSureDAO organization to facilitate such decisions and manage extreme situations. It should be noted that inSureDAO does not have the custody of the fund pool, nor can it release funds to any specific person. Each committee member may be replaced by voting at any time. [18]

inSureDAO will work in accordance with the two core principles of sustainability (that ensures the interests of community members by ensuring the sustainability of the overall funding pool) and growth (promoting sustainable premium increases and inSureDAO membership growth). The members of the inSureDAO organization include several people with specific expertise in insurance, co-governance, and blockchain development. Some powers that committee members have are: (1) Reaching consensus to implement specific code that cannot be automatically deployed; (2) Punishing bad actors within the inSure ecosystem (such as malicious claims, false claims, etc.) by burning SURE tokens. (3) The power to implement emergency suspension under special circumstances.

inSureDAO members can negotiate and propose relevant proposals to the benefit of the inSure network. The voting proposals must include clear voting options and inSureDAO's recommendations. Then each community member is given a period of time to vote, and the result with a majority decision will be implemented. Any inSure holder can become a member of inSureDAO.

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