Riskrails Whitepaper
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Trade credit involves delaying payment to one's trading partners. The buyer of goods or services receives credit and the seller takes the credit risk. However, the credit risk borne by the supplier is often unknown or larger than they realize.

Trade credit is an incredibly powerful catalyst of economic growth. Every pound credited results in circa. 2.5x of trade and the associated taxes and employment that it brings. It is a cheap source of working capital for the beneficiary. Yet in economic downturns it can have an unwanted impact on otherwise solvent businesses by triggering insolvency through no fault of their own.

If the buyer defaults the seller, as an unsecured creditor, is at the back of the queue. They typically receive nothing after preferred creditors, pensions, and the tax authorities.

A small supplier will often be "slow-payed" by customers in financial distress ahead of other suppliers. They may also be paid late simply as a tactic to squeeze more working capital from their suppliers.

The smaller supplier has very little power as they need the business and often have very little information. Where they do have valuable information is through the very same payment data.

This asymmetry is what Riskrails has tapped into to create a trade credit underwriting model that leverages the power of recent payment data.

Trade credit insurance protects suppliers against the risk of their suppliers defaulting. The incumbent industry is dominated by three players. It does not have particularly good market penetration.

Mutual insurance originates from the 17th Century to cover losses from fire. Traditional insurance companies aim to maximize profits, but the overall goal of a mutual insurance company is to provide insurance coverage to policyholders at or near cost. When profits are generated, they either pay the policyholders a dividend or reinvest the profits into the company. It is the author's opinion that a mutual insurance model where members share their data for the benefit of greater risk insight and appropriate premiums for the protection they require would increase the relevance, value and usage of credit insurance. In turn making businesses more resilient.

Furthermore, many businesses while not explicitly wanting insurance may want to be rewarded for their data. Even as an incentive to expose bad actors such as late payers which may in turn create a virtuous loop whereby bad

actors are incentivised to avoid their credit ratings being adversely impacted. There are therefore two initial motives for data sharing. Managing risk and being rewarded for providing data. It is this paper's proposal to use blockchain technology and tokenise the rewards system and data sharing mechanisms but also to manage the governance, risk and insurance operations via smart contracts. The technology then will improve the efficiency of the product and align interest among the members of the mutual.

The ability to pay a dividend would require a security token and fall under existing securities regulations. Alternatively all profits can be reinvested but this could create some problematic second order effects[1]. It is proposed that incentives are given initially via a utility token ("H2O").

To reward non-policyholders, getting a broader coverage of data, the incentives need to be linked to the level of data they provide and the quality. Some of these conditions are only evident after some time. Cash (dividend) incentives could drive bad actors to submit false data which would weaken the risk model. On the other hand, it may be difficult to incentivise data sharing with services alone. A balance then needs to be struck.

Initially risk information (credit reports) will be sold via token with or without sharing information. Utility tokens can be extended to pay for other non-

insurance services such as collections, trade documentation or legal services. All ledgers are amalgamated to create a 'super ledger'. Various data cleaning and processing is required for the 'super ledger' to be stable and not provide spurious predictions. The super ledger will be maintained on chain and made available for others to run models on. Riskrails will allow others to use their models (in a closed "blackbox" format to preserve anonymity of counterparties). It is possible Riskrails will open up the features of the model in a "greybox" model at a later date.

All counterparties will be anonymised. Events (defaults) will be recorded as soon as they are validated. Once validated the defaulter can be revealed (and creditors if it is public information). Other 'events' such as adverse information and non-validated defaults can be submitted and are recorded. They can be validated and staked as part of the claims methodology. Early information is very valuable and will be staked.

Data contributors may be unwilling to share if it is known where the data originates. We aim to validate on the chain but anonymise origin of data so that if the number of contributors is below a certain level the depth of the data is hidden.

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[1] If profits cannot be extracted from the mutual the only way to obtain value is through claims

Mutual Insurance Smart Contracts

Members purchase premiums on any of the Nimbla products (single invoice, single limit, whole turnover) either through the platform or via API.

Premiums will always be determined by the risk of the member's outstanding exposure. The "Pay-As-You-Trade" model means that the member only pays for cover on the credit they extend rather than a forecast or limits. This is a distinction made by the Nimbla underwriting model over traditional products. Pricing is dynamic and there is a limit where cover is no longer provided. The extension of credit when the debtor is uninsurable is then at the own risk of the member.

The "Pay-As-You-Trade" model in conjunction with near realtime accounts receivable data via integrations provides additional benefits. Accurate exposure levels, limit efficiency (avoiding hoarding) and transparency to other sellers.

This mechanism aligns interest for all especially when data is shared. The point at which a debtor becomes uninsurable will be determined by the Mutual according to the current capital reserves in the algorithm and appetite set by the Advisory Board.

Premiums are purchased in Mu token. Mu can be bought in currency or exchanged from H20. Mu can only be used for the purchase of insurance on the network.

Members must maintain connection to their accounting (whole or partial) and continue to provide data.

Members receive risk information and adhere to the terms and conditions on reporting, collections and legal actions using the platform or API.

Members submit claims via the platform, and they are handled by TPA. Later stages could involve a voting mechanism.

If members beat the target loss ratio (TLR) which is set by the Advisory Board they receive credit in tokens. These are utility tokens and must be held for a set term (tbd) before they can be converted to 'Mu' at the prevailing exchange rate. The exchange rate will be determined by the profitability of the mutual. This means that if capital is in demand (either as losses are high or demand from new members/risk increases/turnover growth) then the exchange rate will be favourable. Other structures can be put in place such as a half-life or breakage element where H20 expires (evaporates?) if it is not converted or spent. H20 can be used for credit reports/services immediately.

New members will pay full premium. Premiums for new members will be adjusted for prior loss history/credit control as per the model. As members record a premium history that exceeds losses they will benefit from lower premiums unless the mutual as a whole draws down on the overall reserves.

Legal & Regulatory Structure

A mutual can be loosely defined as[2]

- owned by a defined group of members (such as farmers, teachers, bus drivers, etc.), but may also serve a wider group of consumers;
- having a governance structure which gives members a say in how the organization is run;
- run for the benefit of their members or in their members' interests, with profits retained within the business, or distributed to members and/or their interests.

A strict definition is very hard as there are so many different types of mutual[3]. The primary purpose of the mutual is to satisfy its members' common needs, rather than to make profits or provide a return on capital. Mutual organisations are run for the benefit of its member-owners, as opposed to being owned and controlled by outside investors.

Ownership – the mutual will consist of a finite number of tokens that will be known publicly. Tokens are burnt to pay for premium and staked when the mutual makes a profit. If the total number of tokens is 100k and 25k are burnt as premium and the losses are zero then 25k will be staked and redistributed to the members.

The scheme will start using the Nimbla cell captive model. The rationale for this is that businesses may be sceptical and want the comfort of a traditional insurance model, in addition they may not be prepared to commit more capital than premiums would be normally. The proposal then is to run the structure where investors take the risk on the initial insurance but the members start to accrue a percentage of the overall profits which are reinvested. In return the members must agree to commit for a longer period and start to self-govern. This gradual approach could take 3-5y and result in a true mutual at the end or alternatively members may opt to stay with the cell captive.

One of the challenges of the wider mutual is the ability to serve a wider group who may just be consumers of risk data or both consumers and providers of risk data. The ability to sell the risk data outside the mutual structure has many benefits. It can pay for administrative costs and other fees but it also attracts others to submit data if they can get paid for it.

The concept of a cell means multiple cells can be formed each consisting of a group of members (the mutual) who have some mutual interests that benefit all. A proportion of profits therefore can be returned to data providers. The captive can also earn from selling aggregated risk data.

The jurisdiction of the captive will largely depend on how progressive the local regulatory regime is.

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[2] A practical guide to understanding mutual insurance - ICMIF

[3] https://panteia.com/uploads/2017/01/Study-prospects_mutuals_fin_en.pdf

Transparency levels can be increased with regards to data but all data will be shared with the core underwriting model.

Governance – the mutual will give members a set number of voting rights. The voting rights can be equal or set to the levels of premiums/loss history or other mechanisms. External agents may also have a vote and it is suggested that Riskrails as the network and algorithm owners have a vote.

Voting mechanisms, target loss ratios etc can therefore be set within a cell allowing the cell to run the insurance contracts as best fits their business model.

This could for example mean a high target loss ratio which keeps premiums at a minimum. Alternatively, the cell may choose to optimise the cell for profit, grow it via marketing investment and return profits to members.

In time the regulatory environment could mean a true mutual does not need to be regulated at all. This will bring down administrative costs further.

Network of Mutuals/Cells/MGAs

The vision then is to have a trade credit network (TCN) of nodes that are interconnected through data, operations and possibly reinsurance. Within each cell/MGA/mutual the members can structure the mutual for their own shared interests. This could include greater transparency of data, voting on claims and setting of target loss ratios.

The cells benefit from a shared infrastructure managed by Riskrails. Sitting on top of a shared data pool that is cryptographically anonymised to the wider network (unless transparency is requested). This is core to the underwriting model and will stay central to the network. Premiums will be adjusted via the target loss ratio which can be set by the Mutual (providing they adhere to required transparency and reporting of solvency).

Traditional insurance nodes can connect to the network and continue using the underwriting model while operating as a traditional insurer or MGA. Other traditional insurers can also connect. The network is regulation agnostic.

As the network grows in size and maturity other lines of insurance can be added.

Claims Assessment Methodology

Tokens can be staked by validating the claims process, in particular identifying fraudulent claims (invoices paid but claimed). The stakeholders here would be the insolvency practitioner and claims handlers with access to defaulted companies accounts.

Phases 1 & 2 – TPA
Phase 3 – Member voting mechanism

Capital Model

The Minimum Capital Requirement is set at 99.5% confidence level. The portfolio is rerun using the most up-to-date probabilities of default and correlations such that extra capital is set aside as risk increases. The premium pricing model automatically adjusts pricing according to the rolling loss ratio and any capital shortfall. Reserves as detailed below are to be set to the worst of the current portfolio Expected Shortfall (99.5%), the largest premium income of past 5y or the largest loss of the past 5y.

Capital calculations are run daily at various levels of aggregation (cell, captive, individual portfolios). Capital requirements would initially be set by the Captive owners in strict adherence of the regulatory capital requirements.

As the network grows and becomes more mature both in the number of cells and the age of the cells new capital models can be introduced. These would be on chain and be voted on by members and the Advisory Board for each cell and/or the Riskrails core.
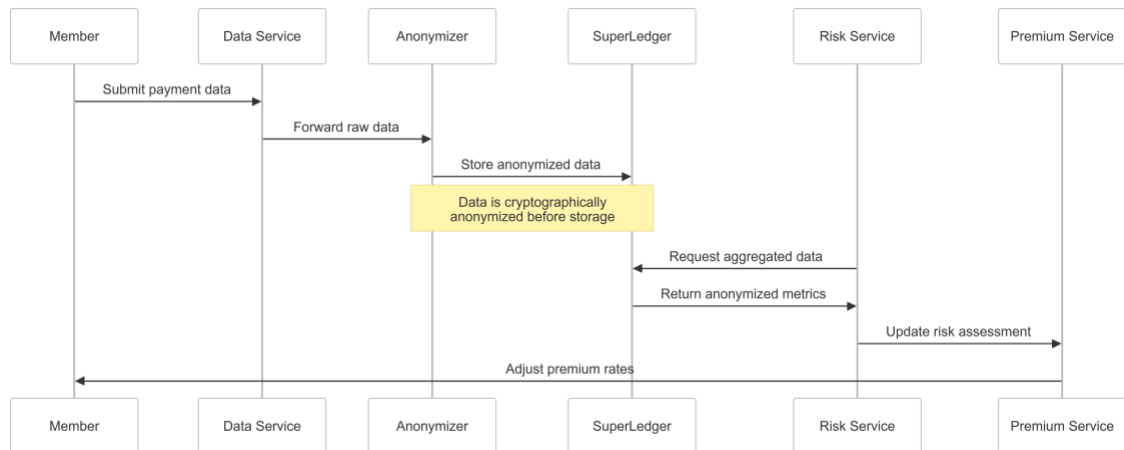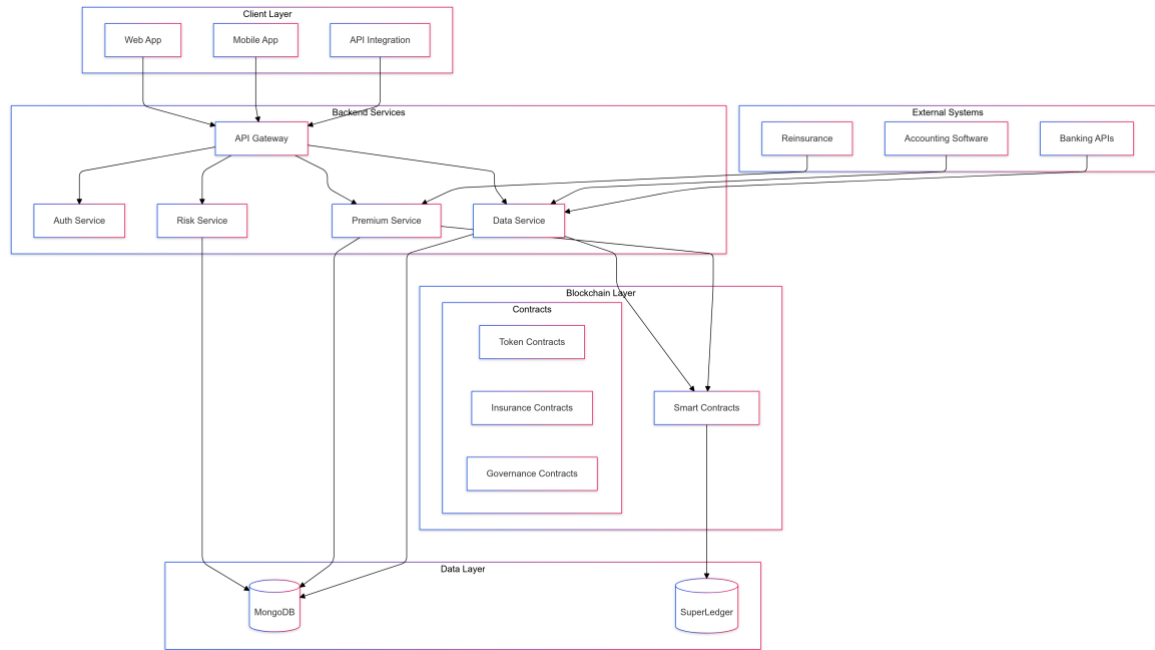
Likewise, economies of scale will come from centralising the investment strategies of the capital and any other reserves. Initially Riskrails would offer these treasury functions as part of the overall administration of the cell captive infrastructure.
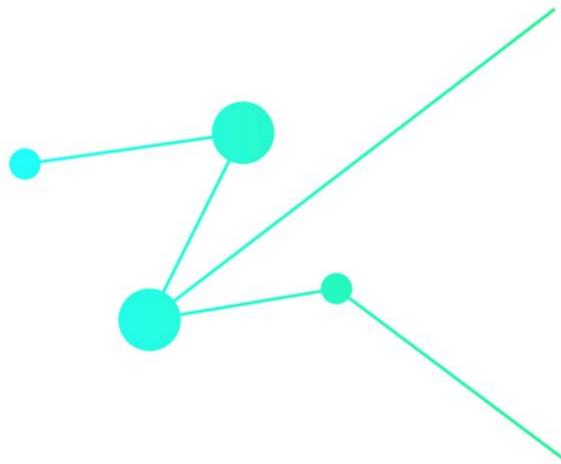
Reinsurance would be purchased to limit catastrophic losses. It is feasible that as the network and cells reach maturity they may wish to put capital to work by re-insuring other cells.

Funding Strategy

It is not expected that all members of a cell will want to contribute the minimum capital requirement upfront. The initial capital requirements then will be raised via ICO through the sale of security tokens ("Mu"). Investors will need to be incentivised for taking the venture risk. It may then be that Mu can be redeemed or sold on a secondary market. This brings significant regulatory challenges. As the cells build up enough reserves over time they can convert to a mutual model.

Client Layer
- Web App
- Mobile App
- API Integration

Backend Services
- API Gateway
- Auth Service
- Risk Service
- Premium Service
- Data Service

External Systems
- Reinsurance
- Accounting Software
- Banking APIs

Blockchain Layer

Contracts
- Token Contracts
- Insurance Contracts
- Governance Contracts
- Smart Contracts

Data Layer
- MongoDB
- SuperLedger

Member	Data Service	Anonymizer	SuperLedger	Risk Service	Premium Service

Submit payment data

Forward raw data

Store anonymized data

Data is cryptographically anonymized before storage

Request aggregated data

Return anonymized metrics

Update risk assessment

Adjust premium rates

Tokenomics

To help explain the economic incentives I have attempted to follow the high level "tokenomics" as outlined by Erick Calder[4].

Stakeholders: a description of the persona of each participant in the system

Nimbla/TCT – insurance & customer/member operations. Earns money by managing the day-to-day operations, customer interactions development and maintenance of technology & risk data models. Regulated to conduct insurance & owner of IP on risk models.

Member – data contributor can be a contributor of pure payment data, their own accounting data or claims data. Typically a small or medium sized enterprise (SME) but could also be a large enterprise wanting to gain better risk insights.

Policyholder - beneficiary of insurance cover against buyer default. Pays for premium in tokens and can stake tokens for beating the target loss ratio.

Token investor – capital provider looking to earn a return

Claims Handler – TPA (Third Party Administrator) investigates and validates claims.

Lender – a sub-type of Policyholder has a requirement for credit insurance but also can consume other benefits such as double financing fraud flags. Where competitors have already financed an invoice and the supplier is attempting to double-up on borrowing.

Introducer – any member can also stake by introducing another member they share on a sliding scale starting from a matched basis (50:50-10:90) for all staked earnings and 5%-1% brokerage on premiums over the next 5y on risk assessment stakes and claims stakes. This encourages members to introduce other members who might be valuable to the overall data pool both for risk assessment and claims as well as for pure premium.

Reinsurer – collects premium in return for covering tail & catastrophic events

Motives: the driving factors behind why stakeholders do what they do

Members are motivated by the desire to access receivables finance, avoid losses, protect against loss and have accurate up-to-date information about their customers. Depending on the level of membership (data contributor or mutual member).

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[4] https://wire.insiderfinance.io/a-tokenomics-primer-2fcb926ff97b

Captive owner – monetises risk underwriting activities and insurance operations functions through fees and accrues value through tokens linked to the performance of the insurance.

Activities: the actions performed by participants in the system

1. Connect accounting/banking software to provide regular feed of invoice data ("the ledger")
2. Monitor existing or research new customer credit information.
3. Insure invoices against insolvency
4. Purchase insurance against customer insolvency
5. Manage regulatory conduct & administration of insurance operation & capital
6. Manage customer facing insurance operations
7. Manage risk models & maintain data and technology
8. Sales & Marketing – acquiring new customers
9. Manage & Validate claims
10. Vote on claims
11. Manage credit control of issued invoices
12. Manage collections & legal activities

Consequences: the repercussions of the activities undertaken, both direct (first-order) and indirect (second-order)

1. Better credit control will mean fewer losses which in turn leads to lower premiums
2. Data aggregation, more data (volume, frequency & recency) will increase transparency on risk leading to fewer losses (and lower premiums)
3. Insuring against customer default will create a more resilient business, improve cashflow certainty and could lead to lower borrowing costs for the insured.
4. Better risk information helps businesses make more informed decisions on who to trade with and how to trade with them.
5. Sharing information can apply pressure on bad actors to change their payment behaviour

Monetisation: the identification of how consequences bind to monetary value i.e. to value exogenous to the system. This concept breaks down into entries and exits, where the opportunity for profit encourages participation in the system at various points along a roadmap

Riskrails is the ultimate owner of the IP of the risk models and network. It will stake according to the performance of the model over the long run and gets founder benefits for developing the initial IP and taking venture risk.

The Captive is the regulated entity that will manage all non-mutual insurance transactions, sales & distribution, claims and other insurance operations. The Captive will stake a set % of GWP for services. The Captive may originate the initial mutual members and will get staked the initial brokerage as per the introducer model above.

The administration of the captive and adherence to all regulated activities will be performed by a TPA. They will receive fees.

Those providing validated data will stake utility tokens and after phase 2 with a suitable time lag can convert them into insurance 'security' tokens. [to be confirmed with legal] Members of the mutual can stake utility tokens for beating the target loss ratio. Again these can be converted to insurance tokens (subject to conditions being met) which can be used to reduce future premiums.

Under the traditional insurance model claims handling will be paid for in fees or tokens

Under the mutual model claims may be voted on or validated by members and paid for in token.

Collections & Legal Actions will be paid for in cash or tokens

The guiding principle of the project is that frictional costs can be reduced gradually over time by transferring more governance and operational activities to staked activities on chain. However, to make sure the project is viable TPAs (Third Party Administrators) will be used to get traction. As alignment of interest intersects within cells these costs will reduce. It is critical though that the central tenet of the sharing of accounting and/or payment data is preserved and rewarded through staking or simply through better risk management.

Reserves should sit at 50% of all profits until such time as they are equivalent to 3x the maximum annual premium or maximum annual loss over the prior 5y. Reserves should not be drawn down unless the entire mechanism is being wound up. In the event that the reserves are deemed excessive it must be voted on by the entire member community including the Advisory Board with a predetermined voting structure.

Where reserves are adequate profits can be redistributed to token holders. This dividend can be taken in cash, ETH or reinvested in tokens which will be invested as per the treasury function. Excess capital can be invested in the mutual via Marketing at the discretion of the Advisory Board with the voting consent of the members.

Should the mutual achieve its ultimate goal members should have both adequate protection and sufficient risk information to mitigate against losses. Furthermore, premiums will be at an optimal level.

Vulnerabilities: can the system be gamed? what arbitrage opportunities does the proposed structure create? can participants gain unfair advantage over others?

Naivety in risk management or collective greed to minimise capital requirements could lead to individual cells blowing up. By pinning the central capital methodology on a transactional margining model this can be mitigated via the transparency offered by the central model.
Transparency in reporting across cells should also help mitigate gaming capital/reserve requirements. Aggregating turnover levels, DSO and capital should provide some high-level comparisons that could highlight error or fraud. Further, if one was to mandate a level of reinsurance this would demand a level of transparency and potentially offer arbitrage opportunities that would normalise risk.

Falsifying accounting and transactional data to reduce premiums either at the expense of other members or in collusion with other members.

Assumptions: what does the system and its participants take for granted?

1.   Crowdsourcing payment data creates a more powerful model
2.   Network benefits become self-reinforcing, outside the network they will have less information
3.   If it gains critical mass – it would actively encourage good payment behaviour
4.   Bad actors will receive no benefit and be removed (policed by members)
5.   Members benefit from any outperformance of the pool
6.   Members benefit from better credit risk information

Ability and willingness of companies to share their data proving the benefits outweigh the risks/misgivings. Layering levels of transparency in data may give some comfort

that the companies own accounting data is not being used to monitor their own credit risk (unless that is a desirable outcome). At the minimum the availability of accounts receivable history is required to either participate in a cell, purchase insurance or earn utility tokens.

There is also a game theory element to the sharing of accounts receivable and payable information. If an actor wishes to try and smear a competitor by falsifying data painting them as a late payer and implying they may be in financial distress the victim of the smear can counter it by providing better validated data. For example, pure accounts receivable or payable history (invoices marked as paid, partially paid or unpaid) can be validated by providing access to verified bank data showing the reconciled payments (via Open Banking).

Roadmap

Phased approach

In order to maximise the chances of success it is proposed that we phase the launch of the mutual and the tokens. The reasons for this are numerous. Small businesses may be wary of solutions that have a 'crypto' element especially at the time of writing. Secondly the ability to build up the minimum capital requirement may not be possible purely through a token. Finally, we want to operate within the existing regulatory regimes and evolve the product in step with regulatory changes.

Phase 1 – Utility Token "H2O"
Reward the data contributors in credit reports and other platform benefits. This will incentivise businesses to contribute data and we can refine the value proposition and staking mechanisms. Unused/excess tokens can be converted to a security token as/when we move to that model. It would always hold that the utility tokens would have to held/earnt/staked over a certain period to avoid gaming.

Phase 2 – Capital Raise via Token "Mu" to create Captive
In this phase we would raise the required capital for the captive via a token. Gates would be in place limiting the withdrawal of capital. The raise will form the basis of the minimum and reserve capital requirements for the Captive.

Phase 3 – Mutual
Combining a group of 'good actors' who require credit insurance product to form a mutual wherein they pay for premiums in token. Tokens are staked by providing data and beating the target loss ratio. The mutual would become a cell of the captive.

ALTERNATIVE PLAN

Start captive immediately. Raise money to capitalise via token. Invite existing customers to mutualise building up small groups of ~10-20 entities focused on specific segments. For example a collective of invoice finance lenders or collective of manufacturers. Create pseudo-cells that sit in the captive and reward at 50% of reinvestment for those that beat loss ratio. Start a gradual shift towards a full mutual with a 5y plan. Bring more on and start charging fees for use of the network.